

The Milbank Memorial Fund
QUARTERLY

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Vol. XII

JULY, 1934

No. 2³

Published by the MILBANK MEMORIAL FUND, 40 Wall Street, New York
 Printed in the U. S. A.



WILLIAM HENRY WELCH

Med. Club.
Medical & surgical faculty,
6-9-36

WILLIAM HENRY WELCH

APRIL 8, 1850—APRIL 30, 1934

IN these days of specialization, the personality of Dr. Welch was peculiarly significant. He was not primarily a bacteriologist, a pathologist, a physician, a teacher or even a statesman—though he was all of these. He was primarily a human being. It was what he was, not what he did, that was of compelling importance.

He had windows opening on every possible aspect of life. He loved clear and honest thinking and he never in his eighty-odd years lost the thrill which comes with a new idea; but he had a keen sense of historical perspective which fitted the new into its place in due proportion. He felt keenly the charm of older days and his later adventures in the book-stores of Europe gave as much satisfaction as his earlier excursions into the young science of bacteriology. He had a highly cultivated esthetic sense; but he also appreciated a good dinner, good wine, and a good cigar. He slipped away from a meeting at Atlantic City to qualify as a licensed aviator. When travelling with a man thirty years his junior on a public health tour in Europe he would put his companion to bed after an exhausting series of interviews and roam about the streets by himself to catch the feeling and the meaning of old Brussels or old Vienna. He lived longer than the Biblically allotted span; and in each day of his long years he tasted more of life than the average man in a week.

From this variety of experience came the richness of his wisdom. He knew the past as a scholar. He knew the present as a *bon vivant*—if we may use the term not in its common sense but as including a savoring of the higher and subtler as well as the simpler values of life. He absorbed and com-

DR. WELCH'S DEFINITION OF A "NEW PUBLIC HEALTH"

Two years before his death on April 30, 1934, Dr. Welch recorded phonographically for Science Service an evaluation of the great crusade for a healthier nation, a campaign that he led so effectively.

The following is an excerpt from his statement as published in the SCIENCE NEWS LETTER for May 12, 1934

¶ It is evident that a crusade directed in the first instance against a single disease, without losing sight of its immediate goal, has assumed in recent years the proportions of a general health movement and this not merely on the negative or preventive side, but even more on the positive side of improvement of the health and increase of the vitality of the whole community.

¶ These newer directions of public and individual health, started by the antituberculosis campaign, have been re-enforced and greatly expanded by similar popular movements organized to promote maternity, infant and child hygiene, social hygiene, mental hygiene, the control of cancer, the prevention and relief of heart disease, and the end of like beneficent movements is not yet in sight.

¶ Among the great lessons taught by these recent health movements is the necessity of securing by popular educa-

tion the cooperation of all the forces of society, both governmental and voluntary, in support of efforts of health departments and of the medical profession to prevent disease and to improve health.

¶ Another lesson is that the attack upon one disease may have incidental and often unexpected benefits not to be measured solely by lessening the incidence of the disease which is the immediate object of attack.

¶ Still another lesson is that existing social, industrial and economic conditions set limits to what is at present attainable in the field of disease prevention.

¶ The most important lesson of all is that success is dependent upon accurate knowledge concerning the causes and mode of spread of preventable diseases, and that the hope of the future lies in increase of useful knowledge by the methods of experimental science.

bined it all into a ripe philosophy which made it possible to plan wisely for the future.

This philosophy was always at the disposal of his colleagues, his friends, his students, even casual acquaintances and correspondents. He responded to people with the same openness and zest which welcomed ideas and experiences. They were not objects of study, not pawns in some game, but human beings. Thousands of young men in particular and by no means only those who were pupils and associates will remember his unfailing kindly encouragement and guidance with lasting gratitude.

He early attained a position so commanding that he was free to say and to do what he felt to be right without the sense of insecurity which paralyses leadership; and his vitality freed him also from those internal protective mechanisms which make a new idea so alarming to the average man. Thus, to wisdom and kindness, courage was added to make him the ideal counsellor.

This was Dr. Welch's function as we have known him during the past quarter of a century—the counsellor-extraordinary of American medical education and American public health and social welfare. In a hundred enterprises within these fields, his influence has been determining. Nowhere perhaps has it proved more significant than in the work of the Milbank Memorial Fund. In my judgment this Fund has displayed an almost unique combination of creative vision and sound judgment. It owes these qualities of its work in considerable measure to its two wisest and most imaginative counsellors, Hermann M. Biggs and William H. Welch.

C.-E. A. WINSLOW, DR. P. H.

HEALTH INSURANCE IN ENGLAND¹

by SIR HENRY B. BRACKENBURY, M.D., LL.D.²

TWENTY-ONE years' actual experience of giving and receiving medical advice and treatment under a system of compulsory and contributory national health insurance has had certain definite results both upon the community and upon the medical profession. It must be understood by American readers that the British health insurance system has from its beginning in 1912 included in its medical benefits only the services of a general practitioner in the patient's home or at the doctor's office; that it does not include the services of specialists or hospital care. In addition to medical benefits, cash benefits amounting to a part of the wages are provided the insured person for a specified period during sickness. All persons employed at manual labor, and all other employed persons with annual incomes of less than £250 are legally required to insure under the Act, these employees paying themselves approximately 40 per cent of the total cost, the employer paying about the same amount, and the state the remaining fifth. Over 15 million persons are thus insured under the law and about 15,000 physicians have elected to serve them under its provisions, these physicians ordinarily giving only a part of their time to insurance practice and carrying on private practice also.

On the whole, and leaving out of account for the moment those features of the British system which are not directly concerned with the provision of medical attendance and treatment, the results are beneficial to both: and when the

²Member of the Royal College of Surgeons of England, Chairman of the Council of the British Medical Association.

¹Reprinted by permission of the author from the *New England Journal of Medicine*, Vol. 210, No. 15, April 12, 1934.

expression "on the whole" is used it is not intended to imply that the benefit is just on the right side after nicely balanced consideration, but merely that there are some points of disadvantage which may be set over against an overwhelming preponderance of advantage. That this is so may be judged from the official resolution passed by the Representative Body of the British Medical Association almost without dissent: "The measure of success which has attended the experiment of providing medical benefit under the National Health Insurance Acts system has been sufficient to justify the profession in uniting to secure the continuance and improvement of an insurance system." It is some eight years ago that this resolution was passed, but since then it has been endorsed, further resolutions have been adopted pressing for an extension of the system to bodies of persons who are not at present included in it, and by a growing conviction, born of intimate experience, it is acknowledged that any suggestion of the abolition of the scheme would be received by an overwhelming and emphatic protest from the profession and insured population alike.

It is important to emphasize the official and definite character of these and the following expressions of opinion of the medical profession of Great Britain in view of the different and incorrect impressions which have been conveyed to American physicians in certain British "correspondence."

There is a similarly official record of what the medical profession believes to be the general benefits to the community which have been either directly due to, or greatly accelerated by, the National Health Insurance scheme. In the Memorandum of Evidence which the British Medical Association presented to the Royal Commission on National Health Insurance they are thus enumerated: "(a) large numbers, indeed whole classes, of persons are now receiving a real medi-

cal attention which they formerly did not receive at all, (b) the number of practitioners in proportion to the population in densely populated areas has increased, (c) the amount and character of the medical attention given is immensely superior to that formerly given in the great majority of clubs, (d) illness is now coming under skilled observation and treatment at an earlier stage than was formerly the case, (e) the work of practitioners has been given a bias towards prevention that was formerly not so marked, (f) clinical records are being provided which may be made of great service in relation to public health and medical research, (g) co-operation among practitioners is being encouraged to an increasing degree, (h) there is now a more marked recognition than formerly of the collective responsibility of the profession to the community in respect of all health matters." These are described as "immense gains," and further experience has not tended to minimize the value of any of them. The only qualification perhaps required is that, except in a few instances, the authorities have failed to make proper use of the potential value of the clinical records made by practitioners. It may be added that in a number of rural areas it has been found possible to maintain medical attention in places which would otherwise have been left derelict.

Such are some of the main benefits to the community. It is natural to ask also whether there is any evidence, as yet, that the general public health has been enhanced as a result of the working of a National Health Insurance system. This is a question, however, which it is impossible to answer, and probably will always be impossible to answer, with any degree of confidence. There can be but little doubt that during the past twenty-one years, in spite of war and economic calamities, the national health has improved; but it is quite impossible to separate the effects of the medical benefit in-

surance arrangements from those of other agencies which have contributed, probably more effectively, to such a result—for example, an increase of knowledge of medicine and ancillary sciences, a more effective and widespread public health administration, a much greater realization of the importance of health matters, and education in personal, domestic, and industrial hygiene. It will be realized, however, that the beneficial effects of these other agencies must have been largely augmented and reinforced by the activities of the physician doing insurance work, without whose services they would have failed of practical application in the homes of the people.

On the other hand, the fact that the provision of cash benefits payable during incapacitating sickness has led to increased claims cannot be taken as indicating any actual deterioration in the general health. It must be borne in mind that the insurance scheme applies to not much more than one-third of the population, that the effects of prolonged unemployment and the aftermath of war are still with us, that the propaganda in favor of securing early medical attention and of realizing the importance of minor illness must at first tend to swell the periods of sickness, and that the recent actual prolongation of life almost necessarily increases the total of such periods. These and other purely medical considerations fully account for an increase in sickness claims. Whatever be its actual effects on the public health there is no doubt at all that the insurance scheme has brought to large numbers of persons the advantage and comfort of having a family physician or private medical adviser in whom they have confidence.

The results to the medical profession itself have also been, in general, advantageous. The system has, in almost all areas and in the case of a large proportion of individual practi-

tioners, increased the feeling that we are colleagues rather than rivals, and has brought about a more conscious relationship between family practice and various aspects of public health service. These are considerable gains. Financially, too, the effects have been beneficial. The aggregate income of members of the profession practicing under the scheme has been largely augmented. There are probably thousands of general medical practitioners today who, without the insurance scheme, would not have been able to earn by the exercise of their profession a sufficient income on which to live. It must not be understood that any money is coming to them through these state insurance arrangements which they have not fully earned. It is the greatly increased amount of work, which the scheme provides for a guaranteed reasonable (though some think not a fully adequate) payment that has led to this improvement. In addition, a large number of physicians find it a relief and comfort that they can now give a fuller attention to many of their poorer patients without the thought that those patients will be afterwards distressed by the presentation of a bill. There is not evidence that the general quality of professional work has in any way deteriorated. No doubt, as in other branches of medical work, there are some who are less skilful and less conscientious than others; but comparing like with like, the best with the best, or the average with the average, it is safe to say that the quality of the service rendered is at least as high among insurance doctors as it is, say, in private practice or in hospital out-patient departments.

It is not to be denied that there are certain drawbacks, dangers, or disquieting features which may be found under an insurance scheme for medical benefit. The most commonly mentioned among those which are real, is the multiplicity of rules and regulations which it involves. No doubt there is

a tendency to multiply and complicate these unnecessarily, but it should be realized that most of them arise from three extremely valuable, and probably unique, features embodied in the English system. These are (1) every registered medical practitioner has the *right* to be a member of the service unless and until it is proved that, because of misconduct, his continuance therein is detrimental to the service as a whole; (2) the close approximation of the conditions of the service as between doctor and patient to those which obtain in private practice; (3) the considerable share assigned to the profession itself in administration. Because of, not in spite of, the confidence in the profession which these features disclose, provision has to be made for the occasional delinquent. If the state has no right to choose which physician shall take part in the service, machinery has to be established for dealing with anyone who conspicuously fails in his duty. If the state has limited its function to bringing together doctor and patient, leaving them free thereafter to act in accordance with recognized or traditional methods, it must provide means whereby, in case of dispute, each may have a square deal. If the state leaves purely medical matters to be judged by a purely professional body, there must be some authoritative delimitation of the respective spheres and some prescribed means for action. All these statutory requirements, rules, and regulations, need not trouble the physician any more than the ordinary requirements of the penal code trouble the law-abiding citizen. In fact, they do not worry him overmuch; they exist largely for his own protection. There is, however, a certain type of mind which tends to be distracted by them, and therefore they should be made as simple and few as possible.

Only two other drawbacks or dangers need be considered—the one affecting the attitude of certain members of the

profession, the other affecting the mind and conduct of certain insured persons. The one is that the system does to some extent facilitate the procedure of commercially-minded practitioners, and the exploitation of unwary members of the profession by ingenious laymen. There is no doubt that insurance practices are more easily and more certainly transferable than ordinary private practices. On the occasion of any such transfer each insured person on a physician's list is afforded the opportunity of choosing another physician, but, in fact, only a very small proportion of them (perhaps 3 to 5 per cent) avail themselves of this at an early date thereafter. This allows of such practices being worked up in suitable areas and then, perhaps at short intervals, being bought and sold as commercial propositions. This danger, however, cannot be said to be prevalent, and it is one which knowledge and experience should easily combat.

The other drawback is that with a quite small proportion of insured persons, their attitude towards their physician may be changed for the worse. Instead of regarding him as a confidential friend and adviser there are a few who come to demand his services as a business right and may be critical and suspicious lest they should not secure their full due. If there were any widespread effect in this direction it would be enough to condemn the whole system, but in fact the enormous majority of insured patients enter into relations with the physician of their choice in exactly the right spirit, and such an attitude as that described is not common and can be readily dealt with by any wise practitioner.

Other supposed drawbacks or dangers are either unreal, or trivial, or not peculiar to insurance practice but more or less common to many forms of medical work.

In conclusion, if, as the result of the British experience, one were to offer any advice to members of the profession or

other persons interested in public health elsewhere, one would feel inclined to say with a good deal of emphasis, that, whatever variation there might be in many details of any proposed insurance health service, certain conditions should be regarded as essential for smooth working and success.

First the three unusual features of the English scheme mentioned above should be regarded as absolutely fundamental—the right of all doctors to be members of the service, the absence of interference between doctor and patient as such when once this relationship has been brought about; the close and appropriate association of the profession itself with the administration.

Secondly, the scheme for provision of medical benefit (i.e., medical advice and treatment) should be separated as completely as possible, both financially and administratively, from any insurance provision for cash payments of any kind.

Thirdly, the scheme should, from the beginning, make provision for a full medical service, not merely for general practitioner attention but also for consultant, specialist, and other ancillary services, and, where circumstances allow, for institutional treatment also. Because of historic reasons which govern the provision and maintenance of the institutional care of the sick in Great Britain, it is found impossible in this country to incorporate hospital provision as an integral part of an insurance scheme, but practicable, however, to secure such provision in direct and intimate association therewith.

Fourthly, the scheme should be administered as simply as possible in topographical areas, and not through a multiplicity of "approved societies." In Great Britain, owing to the vested interests which have already been established, it is recognized that Approved Societies may require to be

represented on whatever local committees administer the scheme. Most of the difficulties and complications that have from time to time arisen under the existing English scheme have been due to the fact that these last three conditions have not been fulfilled; and the British Medical Association in the spring of 1930 issued "Proposals for a General Medical Service for the Nation," incorporating the above stated general principles and urging the extension of the sickness insurance law to cover not only the insured employees themselves but also the members of their families, to provide the services of specialists as well as of general practitioners, and to arrange for hospital care, as measures for increasing the provision which the present law furnishes for attending to the health of the people by securing full medical attention for them. Financial stringency has prevented any attempt to establish such provision during the past three years, but the scheme has been very favorably received in general, and it is under discussion by societies and authorities interested in the public health.

THE AMERICAN APPROACH TO HEALTH INSURANCE

by MICHAEL M. DAVIS, PH.D.¹

"**H**ERE we are," declared David Lloyd George on May 4, 1911, before the British House of Commons, "in the year of the crowning of the King . . . I think that now would be a very opportune moment for us in the homeland to carry through a measure that will relieve untold misery in myriads of homes, misery that is undeserved . . . In this country, as my right honorable friend the President of the Local Government Board said in his speech last week, 30 per cent of the pauperism is attributable to sickness . . . The efforts made by the working classes to insure against the troubles of life indicate that they are fully alive to the need of some provision being made. There are three contingencies against which they insure—death, sickness, and unemployment . . . Taking them in the order of urgency which the working classes attach to them, death would come first . . . Sickness comes in the next order of urgency in the working class mind . . . I should say that between 6,000,000 and 7,000,000 people in this country have made some provision against sickness, not all of it adequate and a good deal of it defective."

On July 17, 1933, Mr. Lloyd George was again the principal speaker, this time at a luncheon to celebrate the twenty-first anniversary of the National Health Insurance Act which he had laid before Parliament in 1911. "The gathering," said the *London Times* on the following day, "had been arranged by the Approved Society Organizations, the British Medical Association, the National Association of Insurance Committees, the National Dental Associations, the National

¹Director for Medical Services, Julius Rosenwald Fund, Chicago, Illinois.

Ophthalmic Associations, and the National Pharmaceutical Union 'to meet those responsible for creating, fashioning, and launching the first National Insurance Act in the United Kingdom, which came into operation on the 15th of July, 1912.' "

In the program of this luncheon there were printed statistics showing that the number of persons insured on June 30, 1933, was 18,500,000; that during the twenty-one years, the national sickness insurance had disbursed the equivalent of three billion dollars in providing cash benefits and certain medical care; and, despite the depression, had accumulated a surplus equivalent to over half a billion dollars. The chairman, the Minister of Health, referred in his address to ". . . the bitter opposition which the scheme excited in its initial stages," and compared it with "the atmosphere of friendly cooperation in which it was administered today."

Mr. Lloyd George said, as reported in the *Times*, "that when he found himself listening to an eloquent tribute to the scheme from a distinguished Conservative and saw that the list of those present included the secretary of the British Medical Association and also the ex-secretary, and that the British Medical Association was among those who promoted the luncheon to congratulate themselves upon the success and triumph of the measure, he rubbed his eyes and said, 'What a pleasant dream I am having. I do hope no one will wake me up.' " . . . "He would like to 'reminisce.' He had just been reading what happened twenty-one years ago. He had almost forgotten what a really bad time he had had until he read it up. It was like rounding Cape Horn—very chilly winds ahead, heavy seas, and some dangerous rocks ready to tear their craft. However, they sailed through, and now it was sailing the Pacific Ocean."

Behind these remarks of Mr. Lloyd George lies significant

history. Through the guilds and other mutual benefit associations, some collective provision against the calamities of sickness and death was known in Europe during the Middle Ages, but the rise of industry and of an increasing group of persons whose sole support was wages made the need for such provision greater than ever before. The law which Lloyd George fathered was built upon conditions existing at the time when he instituted it. It doubled at a stroke the number of persons in Great Britain who would receive cash benefits during sickness, reimbursing them in part for their loss of wages. It somewhat increased, and substantially stabilized, these benefits. It provided for medical care for these insured persons during sickness, on a somewhat more extensive scale and of much sounder quality than they had previously organized. It rendered the financial support of these benefits more ample and vastly more stable by requiring contributions not only from the employes themselves but also from their employers and in a small degree from the state. Thus the scheme had two objectives: protecting against wage loss during sickness and providing medical care for the wage-earner. Both had previously been available less adequately and very much less comprehensively, but it is apparent from Mr. Lloyd George's address in 1911 and from other literature, that the prevention of poverty caused by illness and the relief of distress due to loss of wages during sickness were put forward as the primary pleas for this legislation. Even today, when the two services are measured in terms of money, the expenditures for medical benefits under the law constitute only about 40 per cent of the total annual outlay.

As Mr. Lloyd George shrewdly pointed out in 1911, he was following the psychological trend of the times in endeavoring to meet the demands of the working people themselves. Obviously no compulsory legislation affecting millions of voters

could be set up, in England or elsewhere, on any other basis. Such laws can only extend what has already been prepared for in the popular mind and has been established by voluntary action sufficiently to familiarize a goodly number of people with its advantages and to supply some confidence in the practicability of its administration.

Germany had antedated Great Britain by nearly thirty years in establishing a general plan of sickness insurance. The German legislation of 1883 also grew out of long roots in the past. For many years within the mining industries, and for a shorter time in German railroads, there had been established schemes affording cash payments for loss of wages and some provision for doctors. The German law built upon this system, improved and extended it to cover more persons. In 1885, however, only about 4,200,000 persons were covered. Beginning among industrial wage-earners, subsequent legislation broadened it to reach commercial, agricultural, and other workers. Domestic servants and the bulk of agricultural workers were not included until nearly thirty years after the passage of the original law. By 1930, the number of insured persons had grown to over twenty million—30 per cent of the population of the Reich.

Fuller provision for medical care was the second direction in which the German laws have extended. This expansion has been largely by permissive legislation, making it possible, though not mandatory, for the local groups of insured persons to increase their contributions for the purpose of extending the scope of the medical services. Gradually but steadily, more and more advantage has been taken of these permissive provisions so that in many industrial sections of Germany four-fifths or more of the whole population secure medical care through sickness insurance or through the publicly supported hospital system.

The motives which led Bismarck to introduce the sickness insurance legislation in 1881 have been variously explained. One current interpretation is that he regarded these laws as a way to forestall socialism by removing certain causes of discontent. Whether this point of view is accepted or not, there can be no doubt that discontent due to economic distress was a more significant consideration than the demand for medical care. Bismarck's motives fifty years ago, however, are less significant than the interpretations given to the sickness insurance laws by two succeeding generations of German students and administrators. Prof. Alfred Manes of Berlin, one of the best known specialists in social insurance, writing during the year when the British insurance law went into effect, defined the scope of social insurance as follows:

"Social insurance, and this is in the widest sense of the word, including even optional insurance, has to serve as protection for the following cases of exigency:

1. When there is temporary impairment of the capacity for work, and with this of the earning power, whether this comes about through causes relating to the individual (subjective causes), or through material conditions, namely:

- a. Through sickness (. . . sickness insurance).
- b. Through accident (accident insurance).
- c. Through child-bearing and what follows it (maternity insurance).
- d. Through poor conditions of the labor market (unemployment insurance)."

Without quoting this analysis further, it is clear that the approach is economic. Social insurance, according to this conception, is to be set up as protection against the impairment of earning capacity.

The origin of any institution gives it a direction and trend but does not control its future development. The historical motivation of sickness insurance was primarily economic.

Medical care was clearly needed, somewhat desired, but in popular demand and political significance was secondary to the relief of economic distress due to loss of wages. The reasons for this subordinate place of medical care must be understood not only in terms of the popular psychology which Mr. Lloyd George comprehended so well, but also in relation to the status of medical service at the time sickness insurance legislation began.

What were the characteristics of medical care fifty years ago, when the German laws were initiated? Medical practice was then simple, and only a little specialization had developed. Surgery and hospital service were sought only in exceptional cases. Preventive work was then limited to sanitation and to the attempt to control smallpox and a very few other infectious diseases. The demand for medical care arose chiefly in acute or emergent illness.

With certain modifications, the same conditions prevailed in the England of 1911, so far as the mass of the people were concerned. The medical service which was in the minds of most English wage-earners and their political representatives was care in acute or emergent illness. Specialist service had become well developed in the cities, but except in unusual circumstances was accessible to wage-earners only through the out-patient departments or the wards of the hospitals. These institutional services were wholly charitable, both the hospitals and their professional staffs rendering care without any fees. Thus hospital care and a large part of specialist service did not enter appreciably into the budget of the average wage-earner.

The financial aspects are also significant. In the Germany of the end of the 19th century and in the England of the early part of the 20th, what wage-earners spent for medical care for themselves and their families was undoubtedly much

less than the amount which as individuals they might lose, and which as a group they did lose, in loss of wages on account of sickness. Thus from the economic as well as from the psychological point of view, the provision of medical care was secondary to the relief of economic distress.

Such is the background of sickness insurance. If we now shift our position to the United States and our date from the second to the fourth decade of the century, we find a foreground presenting marked contrasts. In the first place, the expenditures for medical care have become much greater than the wage losses due to sickness. During a prosperous period (1928-1930) estimates made in the Summary Volume of the Committee on the Costs of Medical Care are that the maximum annual wage-loss was less than a billion dollars, whereas the amount actually expended for medical care by families with incomes of less than \$2,500 a year was about one and one-half billion.

Among the lower paid wage-earners, conditions are different. These families (with incomes of less than \$1,200 a year) spend a larger proportion of their income for medical care than the better paid people, but the actual amounts expended per family are smaller, partly because they secure some care at reduced fees and partly because they receive a considerable amount of care, particularly in hospitals, without any payment. The studies of the Committee on the Costs of Medical Care indicated that in 1928-1931 the average charges for care of sickness by families with \$1,200 income was \$49.17. The 6,000,000 families with incomes of less than \$1,200 per year, therefore, spent nearly \$300,000,000 for medical care. The 10,000,000 wage-earners in these families may be estimated to have suffered an average wage-loss of about \$25 per year because of sickness, or about \$250,000,000 for the group. The wage-loss due to sickness in this group

thus appeared to be about five-sixths of their expenditures for medical care.

For families with incomes of between \$1,200 and \$2,500, the expenditure for medical care was about \$1,200,000,000. There are about 14,000,000 families in this group and about 20,000,000 wage-earners. The wage-loss in this group, averaging \$32 per wage-earner per year would have been about \$610,000,000, or a little over half the expenditures for medical care.

This is not to state or imply that wage-loss is unimportant. It is of grave importance for the lower-paid employees and it has significance for all wage-earning groups. To the American of 1930, nevertheless, the family expenditures for medical care have become a larger item financially than the wage-loss due to sickness. This is a very important conclusion, and is, moreover, a new development. The costs of medical care have been rising for a number of years and for several reasons. The apparatus and personnel involved in the diagnosis and treatment of disease have been greatly elaborated. This has enhanced the cost of service. It is still estimated that about five-sixths of all cases of illness can be cared for by a well-trained general practitioner. But a considerable proportion of these cases are minor diseases, e.g., of the upper respiratory tract, while on the other hand the remaining one-sixth of the cases of illness are of the more serious and expensive group, and this one-sixth calls forth an expenditure at least as great as the other five-sixths.

The technological development of medicine has not only increased the total cost of medical service as a whole. It has also enlarged the *range* of costs for particular diseases and conditions. Some diseases are no more expensive to diagnose and treat than they were a generation ago. Others have become vastly more expensive, presumably with justifica-

tion because of the much better results obtained. But the economic effect is to increase the uneven incidence of the costs of care, since those persons upon whom these expensive illnesses happen to descend during a given year are heavily burdened financially.

The increase in the total costs of medical care and in the unevenness of the incidence of these costs have both been enhanced by the larger use of hospitals. Fifty years ago there was about one hospital bed for every 700 of the population. In 1933, there was about one hospital bed for every 125 people. Between 1910 and 1930 our population grew 32 per cent, while the number of hospital beds increased 116 per cent. Hospitalized illness constituted about 50 per cent of the total expenditure of families for all forms of medical care, according to the investigations of the Committee on the Costs of Medical Care. This has been fully confirmed by the recent study of the families of employees of the Metropolitan Life Insurance Company. Even for families of the lowest income group (\$1,200 a year or less), studied by the Committee, 48 per cent of the total annual expenditure for medical care went for hospitalized illness, the percentage being somewhat higher for families of more substantial incomes. Thus hospitalization has become a large, though not the only important, element in the increased cost of medical care.²

In this respect a decided contrast exists between the United

²These figures include all illnesses which were cared for in a hospital during any part of their course, hence they cover some periods of home or office care as well as hospital bills and fees paid to physicians, surgeons, and nurses for services rendered while the patient was in the hospital. The costs for the hospitalized period, however, constitute fully four-fifths of the total costs of these illnesses, or 40 per cent of total family expenditures for all illnesses. It should be understood that in all these references to hospital care, the mental disease hospitals and the tuberculosis sanatoria are excluded. Nearly all these are governmental institutions. The reference is to general and special hospitals caring for acute illnesses.

States and Europe. Hospital service has not appeared to any appreciable extent in the budgets of wage-earners or other people of small means in Great Britain or the European continent. In England, these persons have until very recently been served by hospitals or tax-supported hospitals both on a wholly charitable basis. On the Continent, tax-supported hospitals have provided hospital service for the great majority of people. Professional care in all these European hospitals, moreover, has been furnished by state-salaried physicians, or by a voluntary medical staff whose services are free to patients. In the United States, on the other hand, the larger part of hospital service is paid for by those receiving it, including professional fees for physicians and surgeons. In the United States about one-third of the admissions to hospitals are to tax-supported institutions to which patients make no direct payment, or to free beds in voluntary hospitals. But there are only some 500 tax-supported general hospitals in the United States, and most of these are located in a relatively few cities and in some of the small western communities. The amount of tax-supported general hospital care is growing, but it is still true that most American wage-earners pay something for the care of hospitalized illness out of their family budget. This is clearly shown by the figures above quoted in which families with incomes of less than \$1,200 spent for hospitalized illness nearly half of their total annual outlay for medical care. Hospital bills alone constitute almost 20 per cent, excluding fees for professional services rendered in the hospital and also excluding costs of home care before or after the stay in a hospital during a given illness.

It is not only in the economic aspect of medical care that alterations have taken place during the past generation. A pervasive and fundamental change has occurred in the con-

cept of medical care itself. Whereas medical care was formerly conceived as something to be secured when a patient is beset by pain or fear, many people now seek medical care for minor illness, and its distinctly preventive functions have also vastly increased. This is illustrated in the organized public health services conducted by governmental departments and some voluntary agencies, and also by the concept of preventive care for the individual which is fostered by many professional leaders and by some practitioners. The practice of this type of preventive medicine is most notable in relation to children, in the direction and control of diet, the guidance of personal and industrial hygiene, and in the preventive aspects of dentistry.

There has been a marked reduction in death rates from the diseases of infants and children, and from certain of the partly controlled diseases affecting other age groups. There has resulted a substantial prolongation of the average length of life and an increase in the average age of the population. The larger proportion of older people involves a changed emphasis in the practice of medicine. The care of acute communicable diseases becomes a smaller element whereas there is an increased demand for the care of chronic diseases with which the sufferer may live for many years.

All of these points are items in a general picture of change from a conception of medicine as meeting emergent needs to an ideal of medical service as the prevention and control of illness and the positive promotion of health. It is true that much knowledge of prevention and control is now possessed but not applied, or is applied only to a fraction of the people who would benefit by it. But the conception and the extent of its actual application have already grown enough to exert important economic effects upon medical service and its future trends. We are in a position today to

plan for medical service according to policies which would have been impracticable fifty years ago, even if they had been conceived at that time.

It is a paradox that discussion of the costs of medical care rose to a peak during the prosperous period of the last decade, culminating in the organization of the national committee which studied the subject in 1927-1932; and that most published complaints regarding the costs arose from the middle class. This might be explained on the ground that people of this group are more likely to express themselves in print than are individual wage-earners. The significant fact, however, is that families with annual incomes of \$2,000 to \$5,000 or more did and do complain. The studies of the Committee on the Costs of Medical Care show the reason for this. They demonstrated that about one-sixth of all families in any given year have to bear over one-half of the total expenditure for the care of sickness for all families; that the amounts expended increase with the income of the family; and that the unevenness of the incidence of expenditure is somewhat greater among the upper income groups. Sickness bills running from a third to a half of the annual income fall every year upon a small but significant percentage of middle-class families, and this fact alone is sufficient to account for an annual stream of complaint from individuals; and sickness costs less high but sufficiently large to be burdensome descend upon many middle-class families as well as upon the much larger group with smaller earnings. In former years when the range of sickness costs was lower, and few illnesses caused high expenditures, families with middle-class incomes felt financial pinch due to sickness much less frequently than today. Now, people who are economically secure, humanly speaking, against all ordinary demands, are not secure against the costs of sickness. Thus, the economic prob-

lems of medical care now implicate not merely wage-earners but the whole population, except the 5 per cent with the largest incomes.

In summary, the historical background of sickness insurance is economic, as it was developed on a comprehensive scale in Europe with the primary purpose of income protection, with paying for medical care as a secondary aim. The European experience is full of suggestions for us, but in the United States we now need a different approach, because the costs of medical care now involve larger sums of money and affect many more people than does wage-loss due to sickness, and because the provision of adequate medical care, curative and preventive, holds vastly larger possibilities than in former times for relieving suffering, promoting health, and increasing economic efficiency. For these reasons, the problem of medical care should have priority in plans and programs of action.

The problem of wage-loss should be approached as one of the economic insecurities which is properly to be dealt with by social insurance, but should be fitted in, financially and administratively, with phases of social insurance that are primarily economic, such as unemployment insurance, or as an extension of industrial accident compensation. The evidence from European experience is that we shall interfere with or spoil comprehensive plans for adequate medical care for all the people if we begin by dealing with the wage-loss due to sickness among employed persons. We hear pleas to "separate cash benefit from medical benefit," on the ground that certification of disability by a physician interferes with the independence and effectiveness of the physician when the same man is also treating the patient. This difficulty is very real in many European sickness insurance schemes, but is a problem of organization and of finance,

not of principle, for it can be rather fully overcome under conditions where salaried reviewing physicians are employed and where the method of paying the treating physician is such (as is partly true in England) that his financial interest is in the direction of keeping people well. Cash benefit—i.e., provision against wage-loss due to sickness—could be worked satisfactorily in correlation with (not as part of) a scheme of systematized payment for medical care provided we start by planning for medical care as our primary aim.

Let us therefore move forward with plans for action directed primarily towards an adequate system of curative and preventive medical services. In proceeding thus, it is well to appreciate the fact that in the United States all but the lowest-paid people have been paying for medical service almost or quite enough to provide themselves with adequate care if the payments were systematically made, pooled, and used effectively. Sickness insurance would not mean taking more money from wage-earners as a group. It would mean that this group need spend only what they are spending now. We now pay for a considerable amount of medical care by taxation for the care of certain conditions, such as mental disease, venereal disease, tuberculosis, for the general medical care of the unemployed and other dependent groups, and as a geographical equalizer to help those areas which are unable to support needed services out of their own resources. Both the public and the medical professions would gain if most medical care were paid for by sickness insurance, supplemented by taxation. The incomes of physicians, hospitals, and other agents of medical service would be at least as large as under the present system and would be much more stable. The medical and allied professions in the United States are now evidencing a great amount of interest not only in studying the economic aspects of medicine but also in initiating

or participating in new plans of group practice and group payment. There is now opportunity for those who have been thinking of health insurance from the economic approach to join with thoughtful leaders in medicine, in a cooperation such as was never displayed in any European country, for shaping a coherent and effective program of preventive and curative medical care.

SICKNESS AND THE DEPRESSION¹

A PRELIMINARY REPORT UPON A SURVEY OF WAGE-EARNING FAMILIES IN TEN CITIES²

by G. St.J. PERROTT AND SELWYN D. COLLINS

PRELIMINARY reports of a survey made early in 1933 by the United States Public Health Service in cooperation with the Milbank Memorial Fund have indicated a higher rate of disabling illness among families that had been reduced to poverty during the economic depression than among families whose financial condition was not so affected. The findings of the preliminary reports for some of the cities are confirmed by the summarized results for all ten cities presented in this paper. In addition, the morbidity rate at different ages is compared for persons with contrasted economic experience and the illnesses are classified into broad diagnosis groups for children and adults.³

The sample population in the ten cities comprised 40,163

¹From the Office of Statistical Investigations, United States Public Health Service, and the Division of Research, Milbank Memorial Fund.

²Baltimore, Md.; Birmingham, Ala.; Brooklyn, N. Y.; Cleveland, Ohio; Detroit, Mich.; Greenville, S. C.; Morgantown, W. Va.; New York, N. Y.; Pittsburgh, Pa.; Syracuse, N. Y.

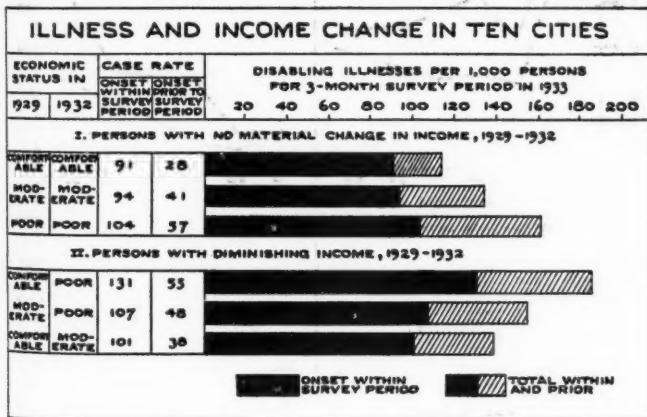
³The reader is referred to previous papers for details as to the method and scope of the survey:

Perrott, G. St.J. and Collins, Selwyn D.: *Sickness and the Depression. The Milbank Memorial Fund Quarterly Bulletin*, October, 1933, xi, No. 4, pp. 281-298; January, 1934, xii, No. 1, pp. 28-34. *American Journal of Public Health*, February, 1934, xxiv, No. 2, pp. 101-107. Perrott, G. St.J.; Collins, Selwyn D.; and Sydenstricker, Edgar: *Sickness and the Economic Depression, Public Health Reports*, United States Public Health Service, October 13, 1933, 48, No. 41. Collins, Selwyn D. and Perrott, G. St.J.: *The Economic Depression and Sickness, Journal of the American Statistical Association*, March, 1934, Supplement xxix, pp. 47-51. Perrott, G. St.J.; Sydenstricker, Edgar; and Collins, Selwyn D.: *Medical Care During the Depression, Milbank Memorial Fund Quarterly*, April, 1934, xii, No. 2, pp. 99-114. Sydenstricker, Edgar and Perrott, G. St.J.: *How Unemployment Affects Illness and Hospital Care. The Modern Hospital*, March, 1934, xlii, No. 3, pp. 41-44.

individuals in 9,130 families for which the data were sufficiently complete for computing the actual income for each of the four years from 1929 to 1932. The population was largely of the wage-earning class, a considerable proportion of which had experienced loss of income due to unemployment and wage reductions. In 1929, 12 per cent of the persons surveyed were in families with an annual per capita income of \$149 or less; by 1932, 46 per cent were in this class. Considering the upper income brackets, in 1929, 40 per cent were in families with an annual per capita income of \$425 or over; by 1932 this figure had decreased to 13 per cent.

In Figure 1 the incidence of all types of disabling illness, onset within and prior to the survey period, is shown among groups of the population classified according to economic history during the depression. The *survey period* refers to the three months prior to the enumerator's visit for which illness data were recorded. The income classification is the same as

Figure 1. Disabling illness during a three-months period in the early spring of 1933 in wage-earning families classified according to per capita income and change in per capita income, 1929-1932, in ten localities.¹

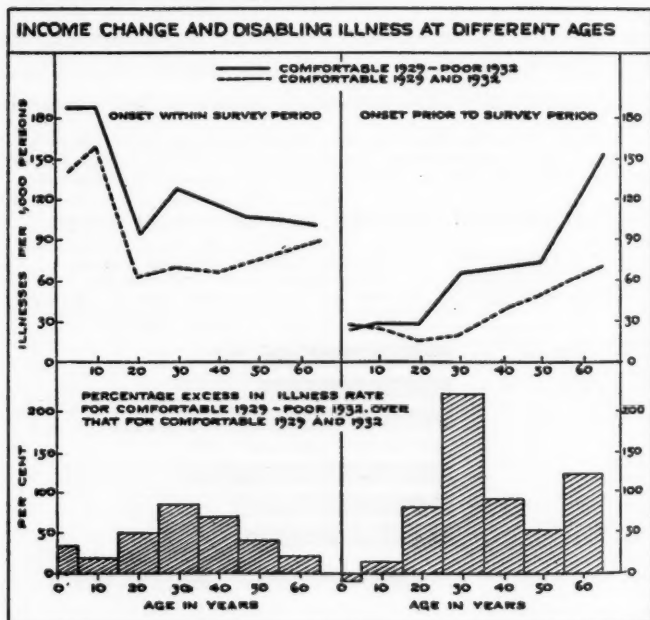


¹Population observed. See footnote to Table 1.

has been used in previous papers, namely: "comfortable" \$425 and over annual per capita income; "moderate" \$150-\$424 annual per capita income; "poor" under \$150 annual per capita income.

In agreement with previous reports, the highest incidence of disabling illness appears in the group which suffered the greatest loss of income during the depression, namely, the group "comfortable in 1929 and poor in 1932." This group showed a rate, adjusted for age, of disabling illness, onset within and prior to the survey period, of 186 cases per 1,000 persons, which was 56 per cent higher than the rate (119 per 1,000 persons)

Figure 2. Disabling illness for a three-months period at specific ages in ten surveyed cities in two groups of wage-earning families, one which suffered a large decrease in income between 1929 and 1932 and the other which maintained unchanged income.



of their more fortunate neighbors who had remained in comfortable circumstances for the entire period.

In the groups of families that experienced a reduction in income, an increased illness rate is associated with increasing amount of income loss. In the group experiencing no material change in economic status, the highest illness rate is exhibited

Table 1. Disabling illness during a three-months period in the early spring of 1933, classified as (1) respiratory and (2) diseases other than respiratory and communicable, among children and adults in wage-earning families classified according to change in per capita income, 1929-1932, in ten cities.¹

ECONOMIC STATUS		CASE RATE PER 1,000 PERSONS ²			
		Onset Within		Onset Prior	
		Under 15	15 and Over	Under 15	15 and Over
1929	1932				
RESPIRATORY DISEASES					
Comf.	Mod.	76	44	6	8
Mod.	Poor	74	57	6	10
Comf.	Poor	103	71	14	12
Comf.	Comf.	74	41	7	5
Mod.	Mod.	70	48	9	8
Poor	Poor	67	67	6	14
DISEASES OTHER THAN RESPIRATORY AND COMMUNICABLE					
Comf.	Mod.	25	37	9	46
Mod.	Poor	26	40	14	62
Comf.	Poor	23	42	18	69
Comf.	Comf.	25	33	15	36
Mod.	Mod.	23	34	12	51
Poor	Poor	17	47	17	82
POPULATION OBSERVED:				TOTAL	
		CHILDREN	ADULTS		
Comf.-Mod.		2,031	5,889	7,910	
Mod.-Poor		4,835	5,847	10,682	
Comf.-Poor		1,107	2,096	3,203	
Comf.-Comf.		683	4,212	4,895	
Mod.-Mod.		2,616	5,630	8,246	
Poor-Poor		2,081	2,408	4,489	

¹Rates are adjusted for differences in age distribution within the groups.

by the group which was "poor" for the four years and the lowest illness rate by the group which was "comfortable".

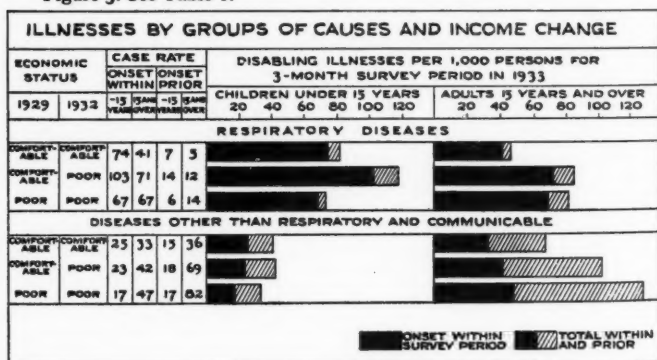
These findings are true not only for the groups of cities previously reported upon as well as for the entire population surveyed, but for each city.

For every age class the groups "comfortable in 1929 and poor in 1932" exhibited a higher rate of disabling illness, onset within the survey period, than the group that had remained "comfortable" for the entire four years. (Fig. 2.) The same relation is shown for illnesses having onset prior to the survey period except among the very young children (under 5 years).

The increase, if it may be so termed, in the illness rate in families whose income dropped over the rate in families whose income did not change materially was greater among adults than among children. This was shown both for illnesses which began during the survey period (chiefly acute) and for illnesses with onset prior to the period (chiefly chronic). The greatest excess appeared in the ages 25-34 years for both groups of illnesses and among persons 55 years of age and over for illnesses with onset prior to the survey period.

Table 1 and Figure 3 show disabling illnesses divided into

Figure 3. See Table 1.



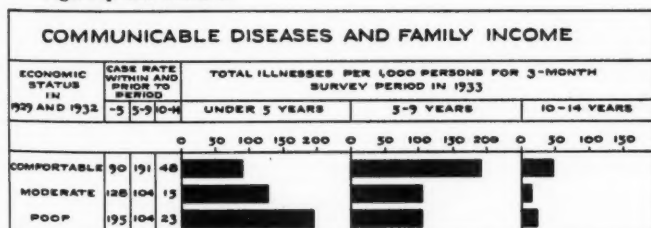
two broad diagnosis groups: (1) respiratory, and (2) all other diseases except communicable; each class is given for children (under 15 years) and adults (15 years of age and over).

For *adults*, the same sequences with economic status are evident for both diagnosis groups as appeared for all types of illness (Fig. 1). In the respiratory group, the greatest differences appear in the illnesses having onset within the survey period; in the non-respiratory group the illnesses with onset prior to the period, largely chronic diseases, show the greatest variation with economic history.

For *children*, the highest rate of respiratory illness is shown by the group which had suffered the greatest economic reverses (comfortable in 1929—poor in 1932). This group of children had a disabling illness rate, onset within and prior to the period, of 117 as compared with 81 per 1,000 for the group which was in comfortable circumstances for the entire four years. Considering diseases other than respiratory and communicable, very little difference in illness rate is evident among children in the different economic groups.

The communicable diseases of childhood, however, show an entirely different kind of association with economic status from that which appeared for other types of illness. In order to analyze this new relationship, a more detailed tabulation was made of the four cities in which an appreciable number of cases of these communicable diseases was prevalent. (Fig. 4

Figure 4. See Table 2.



ECONOMIC STATUS		CASE RATE PER 1,000 PERSONS			POPULATION OBSERVED		
1929	1932	Under 5 years	5-9 years	10-14 years	Under 5 years	5-9 years	10-14 years
Comf.	Comf.	90	191	48	78	89	105
Comf.	Mod.	114	186	62	323	317	258
Comf.	Poor	92	152	63	239	205	144
Mod.	Mod.	128	104	15	149	327	401
Mod.	Poor	158	118	35	392	689	666
Poor	Poor	195	104	23	159	336	384

Table 2. Communicable diseases among children in the early spring of 1933 in wage-earning families classified according to change in per capita income, 1929-1932, in Birmingham, Cleveland, Detroit and New York.

and Table 2.) The extremely interesting fact appears that for the young children (under 5 years) the highest rate of infectious disease is exhibited by the "chronic poor" and the lowest rates by the three groups that were comfortable in 1929. Economic experience during the depression does not appear to be correlated with the illness rate for these diseases. Among the children in the ages 5-9 and 10-14 years, the sequence is reversed—the comfortable groups having the highest rates and the poor classes the lowest.

Evidently the children of the poor contract the communicable diseases at an earlier age, on the average, than the children of those in better circumstances. Thus, when a group of "poor" children arrive at school age, a relatively high percentage of them have already had the communicable diseases. The children from families in better circumstances, being less exposed to cases of infectious disease in early childhood, show a relatively high rate in the early school ages.

The "depression-poor" had apparently not been in straitened circumstances for a sufficient time to acquire the living habits or other environmental conditions of the chronically poor that are responsible for a high incidence of communicable diseases at the earliest ages.

PRACTICAL ADMINISTRATIVE POLICIES FOR SUPERVISION OF CHILDHOOD-TYPE TUBERCULOSIS

BASED UPON EXPERIENCE IN CATTARAUGUS COUNTY

by JOHN H. KORN, M.D.¹

THE experience of the Cattaraugus County Bureau of Tuberculosis, since its organization eleven years ago, has led to a slight variation from the program commonly proposed for the supervision and institutional care of children showing childhood-type tuberculosis.

The tuberculosis infection incidence among children, as judged by the intradermal test with 1.0 mg. or less of standardized Old Tuberculin, has been found to be very low. Fifty-seven children of preschool age, tested in a series of health examinations of an unselected sample of the village and rural population all failed to respond to 1.0 mg. of Old Tuberculin; 640 children from ages 5 to 19 inclusive, from the same group, showed 9.8 per cent positive reactions. Of 1,103 apparently healthy school children aged 5 to 19 inclusive, from eighty-five rural and village schools 10 per cent showed positive reactions. Even in the clinics conducted by the Bureau throughout the County, in which about 75 per cent of the children were urban and in which 10 per cent had had domiciliary exposure to positive sputum, the infection incidence in those under 20 years of age has averaged only 16 per cent for the past six years. Among those not known to have been exposed to a positive sputum within the household this incidence has decreased gradually among those under 16 years from 19 per cent in 1928 to 3 per cent in 1933. The average for 2,094 clinic children under age 20 without known household exposure to positive sputum

¹From the Cattaraugus County Department of Health and the Division of Public Health Activities of the Milbank Memorial Fund.

tested in the six years was 12 per cent. The average for the 207 tested who were known to have been exposed to positive sputum within the household was for the six years 66 per cent or five and one-half times the incidence of the unexposed group. It is probable that the population of the County under age 19 is infected to the extent of not more than 12 or 13 per cent.

It is our experience that casual infection during childhood has not resulted in the production of massive lesions, as judged by the X-ray film, nor has it been associated with the development of the adult type of tuberculosis. Of 493 reactors under age 16 seen in clinics and school surveys in the last six years, 170 had had household exposure to positive sputum. These 170 showed in fifty-eight instances (or 34 per cent) tuberculosis of the childhood type or some form other than

Table 1. Children and adolescents observed from 2 to 10 years classified according to reaction to tuberculin and X-ray evidence of disease, Cattaraugus County.¹

CLASSIFICATION ACCORDING TO SEX AND EXPOSURE TO TUBERCULOSIS	TOTAL CHILDREN OBSERVED	NON- REACTORS ²	REACTORS, X-RAY NEGATIVE	REACTORS, X-RAY EVIDENCE OF PRIMARY INFECTION
Total number observed	500	200	200	100
Boys	238	97	96	45
Girls	262	103	104	55
Number of person-years observed	1,742	668	644	430
Household exposure to positive sputum or other excreta:				
Known	93	12	42	39
Suspected	54	4	26	24

¹A total of 1,427 X-rays were taken and may be classified as follows: non-reactors, 142; reactors, X-ray negative, 749; reactors, evidence of primary infection, 536. The X-rays include numerous oblique films and stereos in addition to flat postero-anterior films.

²156 of the non-reactors received 1.0 mgms. O. T., the remaining received 0.1 mgm. A total of 559 tests were made.

adult type. And while some of the remaining reactors, not known to have had household exposure to a positive sputum, also showed some lesions by X-ray, these children were proportionately less numerous and the lesions were much less extensive in the individual reactors. Moreover, none of the reactors acquiring infection casually has since shown evidence of the adult type of lesions.

A group of 500 children who have been kept under observation for varying periods was studied. These are divided into two main groups, 200 non-reactors and 300 reactors, as shown in Table I. The 300 reactors are further subdivided into those showing no X-ray pathology and those with childhood-type tuberculosis. Nearly all of the 300 reactors are still in the County and the plan is to continue supervising them into early adult life.

These 500 children were first observed in clinic or in school surveys, those in tuberculous households having been asked to come in because of their exposure. Many of the non-reactors came from households where a non-contagious case of tuberculosis had been diagnosed or they were applicants for health camp. The sexes are quite evenly represented, and the children are distributed by residence throughout the County with no preponderant numbers from the rural sections (123 of the 200 non-reactors and 168 of the 300 reactors live in the rural part of the County). While a consistent effort has been made by the Bureau to stop their contact with open cases of tuberculosis, these children, for the most part, have continued to live at home.

These 500 have been observed for 1,742 person-years. About 50 per cent of the reactors have been followed into adolescence. None of the 200 non-reactors has developed a positive reaction although five reactors have later become negative after retesting with equal or larger doses of tuber-

culin. One of the 200 reactors showing originally no X-ray pathology developed at age 14 a minimal adult type of lesion but only after sleeping with her mother for two months while the latter had a positive sputum. Two of the 100 reactors, originally showing by X-ray childhood-type tuberculosis, have developed the adult type, one at age 15 and one at 16. One of these had remained in the home with his father who has had a positive sputum for some years. The second had had heavy childhood exposure in the home seven years ago but none known since that time. This girl, however, had led a very strenuous life in school, playing on four high-school athletic teams. She had had almost a year's care in the county sanatorium in 1926-1927. The remaining ninety-eight reactors who originally showed lesions in various stages have since shown retrogression of these lesions without the development of new ones that were discoverable.² To date, therefore, we have seen three out of 300 reactors develop adult tuberculosis, two of them after continued or renewed exposure to a positive sputum within the home.³

There are other adolescents in the County who, after familial exposure in childhood, have developed adult tuberculosis, although it is unusual that the primary lesion can be identified by X-ray. In a majority of instances, however,

²The age distribution of the 300 positive reactors at the beginning of the period of observation was as follows:

AGE GROUPS	PER CENT	
	Reactors, X-ray Negative	Reactors, X-ray Evidence of Primary Infection
0-4	6.1	10.7
5-9	23.2	33.0
10-14	43.4	33.0
15-19	27.3	23.3

³The third developed her adult tuberculosis in spite of a year's care in the sanatorium at the time when her childhood-type lesion was discovered.

it seems that tuberculosis of adolescence, especially late adolescence, appears in individuals who give no history of exposure within the family. Occasionally a source of exposure in high-school is found. Sometimes the individual returns ill from college or work in a city outside the County and usually attempts to trace the infection to an individual have been unsuccessful.

A search was made for the source of infection in the new cases appearing between ages 15 and 21 inclusive during the last six years. These cases numbered thirty-four. In twelve, or 35 per cent, the source definitely was within the family or household, in twenty-two, or 65 per cent, it was apparently not within the family or household. This statement is being made after examining by X-ray all the household members of twenty of the above thirty-four cases, and some of the members of the other households, and after a careful recording of histories which has included questioning other members of the family as well as the family physician. The possibility of exposure to former members of the households has been kept in mind. Other observations on adults tend to confirm the belief that a large proportion, about half in fact, of the cases develop in individuals who have had no known exposure within the home to tuberculosis.

Granted there is a heavy childhood infection, with X-ray evidence, what is the obligation of the official anti-tuberculosis agency to these children? Most observers agree as to the essential mildness of the primary infection, no matter what potential danger it may hold. It is extremely difficult if not impossible to secure evidence that institutional care of primary lesions will prevent the later development of adult tuberculosis. Apparently the primary lesions fibrose or calcify as well outside sanatoria or preventoria as within them. In Cattaraugus County we have no preventorium so

we have been obliged to house children and adults under the same roof in the sanatorium. Under the conditions as they exist in the sanatorium it has been practically impossible for us to prevent some reinfection of the children.

In outlining a program covering practical administrative policies for the supervision of children who have childhood-type tuberculosis it must be emphasized that this is done primarily for Cattaraugus County where infection, morbidity, and mortality rates in tuberculosis are low and are decreasing. And since the word "practical" is included in the title of this paper it is only natural that one should seek a minimum-cost plan that will safeguard the children and the community.

Our aim and methods might be stated tentatively as follows:

1. Prevent childhood infection if possible by the use of safe milk and by the prompt removal of active pulmonary cases from the home. This presupposes alert, cooperative physicians and an adequate clinic and consultation service. Presumably it is better for young people in this County to grow up with their tissues unsensitized to the tubercle bacillus. They may become infected later but by the time they are adults they should be able through their own knowledge and volition to protect themselves from prolonged and massive infection in a way they could not as infants or small children.

2. Institutionalize all sputum-positive patients as soon as possible and until they are sputum-negative. At least they should not return to their homes with a positive sputum if there are children there.

3. Allow juvenile reactors, both those with and without X-ray evidence of primary lesions to remain at home if the health environment is reasonably satisfactory, provided of

course that bed rest or close medical supervision is not needed. A sanatorium, where contact with open cases is likely to occur, would not seem to be a suitable place for highly sensitized, apparently healthy children. A child with a positive sputum or with an adult type of lesion is a proper patient for the sanatorium.

4. The medical supervision of reactors among children perhaps may well be somewhat less intense than it has been in the past. Heretofore we have attempted to X-ray such children every three, six, or twelve months, depending upon the state of the lesions, partly with the hope of learning something about their evolution. Now because we have seen so few adult lesions develop in these reactors and for other reasons of a practical nature we plan to X-ray only once in three years up to age 15, always making allowance of course for the exceptional case, especially the child who continues to live at home where there is an open case of tuberculosis. After age 15 we hope to X-ray annually up to age 22. With a properly functioning generalized nursing service it is assumed that nurses will keep in touch with the reactors and with health conditions in their homes.

5. In view of the fact that a considerable number of adolescents who have had no contact with tuberculosis in the home develop the disease, not infrequently in an insidious yet very serious form, it is important that all high school students have their chests X-rayed at least once before they leave school. If advantage of this opportunity for an X-ray examination be not taken, on a voluntary basis, the boards of education should be encouraged to require it as supplementary to the school physician's examination.

AN EXPERIMENT IN HEALTH EDUCATION IN CHINESE COUNTRY SCHOOLS

by C. C. CH'EN, M.D., M.P.H.¹

SINCE over 85 per cent of the Chinese population live on the farm, it is perfectly obvious that significant improvements of this country can occur only when the standard of living of the millions of farmers is improved. Anyone who has any amount of knowledge concerning the life of our farmers realizes the seriousness of their total lack of health consciousness. In order to develop health consciousness among the peasants, the Chinese National Association of the Mass Education Movement has included in its four-fold program of rural reconstruction (i.e. cultural education, livelihood education, public health, and citizenship training) for working out practical methods of health education. Sir Arthur Newsholme with his wide experience in public health has well said that only four types of health education are fruitful, "first, health teaching to those actually engaged in caring for the sick, whether physicians, or nurses, or students for such future work; second, health teaching to those who, at infant welfare centers or elsewhere, deliberately attend in search of such teaching; third, health teaching to the members of official health organizations and of voluntary agencies who organize public health measures and the care of the sick, and lastly, health teaching as a systematic part of school life." The validity of his expressions is substantiated by all those who have devoted themselves to the cause of protecting the health of the people. Nowadays, whenever

¹Head, Department of Public Health, Chinese National Association of the Mass Education Movement, Ting Hsien, China. This Department of Public Health has received financial and technical assistance from the Milbank Memorial Fund since 1929.

the technique of publicity is applied to spread gospels of health, it is considered as an adjunct to specific practical measures, and there is very little justification in thinking that public health publicity by itself would result in significant achievements in modifying people's mode of living. This is especially true in this country where most of the publicity methods are not practical, either because the people are too poor to afford them, or because the very high percentage of illiteracy among the peasants forms an almost insurmountable obstacle. Consequently, the students of health education in this country have come to agree that, whenever possible, health education should be conducted as a systematic part of school life.

In Ting Hsien, we have two types of schools. One is the People's School that was invented by the Mass Education Movement primarily for eliminating illiteracy among the masses. The other type is the primary school which is run according to the regulations of the Government. The latter lasts four years and the former four months. The standard text for the People's School is the well-known "People's Thousand Character Lessons," in which there are eight complete lessons on health and twelve references to health matters. As the period of schooling here lasts only four months and the classes usually take place in the evening, not much more can be done in health besides the classroom instruction as referred to. On the other hand, the primary schools are extremely important from the standpoint of developing health consciousness and habits in rural communities. In the first place, the receptive minds of children in primary schools present possibilities for health education that are not obtainable in older individuals. In the second place, most of the children who are able to enter a primary school at all usually can get through its second year, and the advan-

tages of educational continuity for two full years are far more than those offered by any other short-termed types of systematic general education in later life. Lastly, the traditions and habits of Chinese society are deeply-rooted and the shortest way of changing them is through the younger generation at school. Consequently, special emphasis has been given in Ting Hsien to development of methods of systematic health education in primary schools.

Before going into the description of methods that have been worked out in Ting Hsien, it seems necessary to say a word about the importance of experimentation in health education of the country schools. Although large cities in China are not yet modernized in the Western sense of the word, there exists already a marked difference between education in a city school and in a country school. A country school is usually single-roomed, with children of four grades under a single teacher, a man as a rule. In Ting Hsien, almost every village has a school of this kind. The school is controlled by a principal who is elected by the village people and acts as a volunteer officer of the village government. He generally dictates the policy of the school and has the right to appoint the teacher. The annual budget, the largest expenditure of a village, generally averages about \$250 a year.² The salary of the teacher varies from \$120 to \$180 a year. It is therefore quite plain that after subtracting the salary of a teacher the amount of money for promoting the welfare of the children in a country school is almost negligible. Therefore, the poverty of the school, reflecting as it does the economic status of the villagers, does not permit introduction of methods of health education that have been worked out under more favorable conditions.

²The reader should keep in mind the fact that Chinese dollars are based on silver. *Editor.*

China has been condemned by careful observers as possessing too many schools of very poor standard. As an illustration, we have normal schools everywhere, but very few good teachers for children. These teachers have learned a great deal of theory in educational philosophy or administration, but their training is so far away from realities of life that they do not even appreciate the significance of cultivating such fundamental habits and attitudes of human life as those concerned with health protection. On the other hand, it will take many years to have them replaced with better teachers even if we might have better normal schools right away. Consequently, the teachers of today are the only possible agents of health education in the country schools. Methods of health education for the children of country schools must be workable in their hands. This again necessitates experimentation.

In addition, one should not neglect to mention the lamentable paucity of medical and nursing personnel in the country. Inasmuch as each school could hardly spend more than two dollars a year for such an important activity as health protection, it is obviously impossible for a new school to support a full-time nurse, not to say a physician. It is equally impossible to expect a nurse to take charge of over twenty schools with the present conditions of transportation. It is therefore but natural that even with regard to medical supervision in country schools, special ways of doing it have to be discovered. In other words, experimentation is needed to ascertain the extent to which medical supervision may be carried out essentially by lay teachers, the only people available in rural conditions.

On account of the foregoing reasons we have conducted an experiment in rural school health education which may be described in the following order:

1. *Inspection of Schools.* Before introducing new things into a school, it is necessary to know about its general conditions. In our experiment here we first made a visit to the primary schools in the city and in the suburbs, and thus got acquainted with their principals and teachers. The latter's answers to certain specific questions helped to determine selection.

2. *Selection of Schools.* Out of the number of schools inspected we selected, on the basis of all available information, fourteen schools covering a school population of about 1,000 children. Then we tried to talk with the teachers and students in these schools on the importance of health protection and made some general suggestions.

3. *Conference.* Through further negotiations, a date was fixed on which the principals and teachers of the selected schools were assembled at a central place. In this conference, definite procedures to be carried out in their schools were described, and the amount of money needed, however small it might be, was reported for discussion. This conference and the experience gained later indicated that two things are necessary. One is the presence of some educational officials, and the other a meal for everybody present.

4. *Physical Examinations.* Physical examination in rural schools has several objectives. First, it is to create a new atmosphere in schools and in villages regarding care of the body. Second, it helps to arouse the interest, or rather curiosity, of the villagers in what a school may do with their children. Thus it enables the principal and the teacher to see many physical defects in their students that they could not see without the help of a physician. Fourth, it leads to correction of some outstanding defects of school children. Lastly, it gives a physician an unusual opportunity to teach teachers and children simple methods of protecting health.

The primary significance of a physical examination therefore lies in the very act itself, not in its completeness, which is usually impossible under rural conditions. Bearing these points in mind, we sent a physician to visit different schools at fixed dates, and finished the examination of about 1,000 school children in about ten days. The examination included the eyes for trachoma and other diseases, the ears for discharge and impaired hearing, the skin for ringworm of scalp, and the rest of the body, especially the hands and neck and the teeth, for cleanliness and caries. Special attention was given to trachoma and tinea of scalp. Trachoma, including doubtful cases, occurred in 75.6 per cent and ringworm of scalp in 19.9 per cent of the 1,255 children examined.

5. *Health Talks.* In order to avoid abruptness in introducing specific measures of health protection, it was deemed highly necessary to give one or two talks to the students about what school health work was. In fact, we gave demonstrations of school health procedures in the presence of the teacher and villagers. Following the talks, these children brought home interesting news to their parents, and this gave a chance for the conservative parents to show their reactions, favorable or otherwise, before the main program began.

6. *Beginning of the Main Program.* The program began with correction of two defects, trachoma and ringworm of scalp. A wooden box was prepared to contain only four drugs, 5 per cent copper citrate ointment, Whitfield ointment, tincture of iodine, and vaseline for trachoma, ringworm of scalp, superficial cuts and infection of skin, and preventing chilblain respectively. Each school bought a box at the cost of one dollar, and promised to pay about sixty cents to a dollar per year for the up-keep of its contents. A nurse visited each school once a week, and at each visit the nurse treated

	1932 (MARCH-AUGUST)		1933 (MARCH-SEPTEMBER)	
	Cases Treated	Cases Cured or Much Improved	Cases Treated	Cases Cured or Much Improved
Trachoma	474	153 (32.4%)	529	279 (52.7%)
Tinea of scalp	143	73 (51.1%)	66	51 (77.3%)

Table 1. Correction of defects.

the children's conditions by the use of the box. Thereby the teacher learned how to give simple treatments himself. Some teachers began to give these simple treatments after the second or third visit of the nurses. This seemed to be the only way of training teachers in using the box effectively.

7. *The Program.* Through the cooperation of the nurse and teachers, it was possible to demonstrate to the lay public in a period of two to three months the usefulness of the work by an appreciable decrease of diseased children with trachoma and ringworm of scalp. As soon as the effect was well demonstrated, the teachers became proud of keeping up the treatments as a routine, and they no longer received objection from the parents of some children. Table I indicates the effectiveness of treating trachoma and ringworm of scalp in the hands of teachers in Ting Hsien schools.

Table 2. Response to treatment of trachoma.

SEVERITY OF CASES	CASES TREATED (March, 1933)	CASES CURED OR MUCH IMPROVED (August, 1933)	IMPROVEMENT IN PERCENTAGE OF CASES TREATED
Slight papillary hypertrophy	292	146	49.9
Moderate papillary hypertrophy and for follicles	188	83	44.1
Highly advanced papillary hypertrophy and complication from cornea or eyelids	58	21	36.2

A more detailed analysis of the results from treatment of trachoma in the period of 1933 is shown in Table 2.

It is quite clear that the milder the cases, the better the

Table 3. Number of treatments necessary for clinical cure of trachoma and ringworm of scalp.

Number Treatments	Cases Trachoma Clinically Cured	Cases Tinea of Scalp Clinically Cured
10-20	23	8
20-30	10	1
30-40	14	6
40-50	17	—
50-60	6	1
60-70	14	2
80-90	3	—
90-100 and over	2	1
Total	89	19

response to the treatments in the hands of teachers.

In attempting to ascertain the number of treatments needed for clinical cure of these two defects, we followed 108 moderately severe cases rather carefully by frequent examinations. The results are given in Table 3.

It is interesting to notice that apparently most of the cases of trachoma and ringworm of scalp as found in the rural schools here do not need more than fifty treatments.

As soon as the favorable effect of treating trachoma and ringworm of scalp was made evident, organization of a health corps in each school was introduced. The corps' regulations are as follows:

Objectives

1. To improve cleanliness of the school, individual and environmental
2. To promote practice of health habits

Organization

1. The corps shall have a commander and a lieutenant-commander to be elected from the third and fourth grades, a lieutenant-secretary, and a number of lieutenants (one for each five members)

2. The tenure of office shall be one year and annual election shall take place each autumn
3. The classroom teacher and the visiting nurse shall be advisors to the corps
4. The duties of the officers shall be separately outlined

The first function of the corps was to perform cleanliness inspection every day. A lieutenant examines his five subordinates and reports to the commander. The commander examines the lieutenant and lieutenant-secretary. The inspection is graded according to the arbitrary standards for the present time, as follows:

- A. Circumoral region + fingers and nails + face *clean*
- B. Circumoral region + fingers and nails *clean*
- C. Circumoral region *clean*

At each inspection the grades are recorded in a printed form, and the latter is constantly hung in the classroom. In our schools here the improvement of personal cleanliness generally became obvious in a short time and statistically we may show the improvement in percentage of A, B, and C, in Table 4.

This table brings out quite a few interesting points. First, in corresponding months of two years, the standard of cleanliness in 1933 is considerably higher than that of the previous year. Second, it is shown here that cleanliness inspection performed by students themselves is an effective educational

Table 4. Improvement of cleanliness.

	A		B		C	
	1932 Per Cent	1933 Per Cent	1932 Per Cent	1933 Per Cent	1932 Per Cent	1933 Per Cent
April	27.2	44.3	54.4	47.4	18.4	8.3
May	37.3	48.3	51.5	42.0	11.7	9.7
June	36.9	53.7	50.7	38.6	12.4	7.7
July	31.8	52.6	56.8	39.7	11.4	7.7
August	36.4	56.7	51.0	38.1	12.6	5.2

measure. Third, the arbitrary standards as set up are satisfactory for children in the country schools here, because after two years about 5 per cent still remain in the C group. In other words, in the period of time for which most children can afford to study, over 50 per cent of them have shown some effort to become cleaner than before. Lastly, apparently the differences in economic status of the children set some natural limits to individual standards of cleanliness beyond which education alone cannot accomplish much.

In addition to cleanliness inspection, the health corps had also other functions such as maintaining the cleanliness of the school premises and regular inspection of latrines. The results of these efforts have become very definite to an observer, but it is much harder to measure them in figures than those of personal cleanliness. A health corps in each school as a rule had a regular meeting each month and the members of the corps generally brought up questions of health for discussion. The records of these meetings were quite interesting. For illustration, let me quote three short passages from the original records of the health corps in a single-roomed school which is located about a mile from the east gate of the Tingsien City:

First Meeting of Health Corps.

Time: 4 p.m. November 11, 1932.

Commander Tien presides at the meeting.

Record taken by Wang.

1. Performance of general ceremony.
2. Discussions on fingernails. It was pointed out that the fingernails of the members of the Corps are too long, and the long nails are apt to carry dirt.

Resolved: From now on the lieutenants be responsible for warning those members who have long fingernails and all nails be cut short and kept clean in the near future.

Seventh Meeting.

Date (missing)

Discussion on an atomizer for spraying water on the ground before sweeping it. The instrument was broken and could not be used any more.

Resolved: The Commander be entrusted to report to the teacher and the latter in turn to the trustees of the schools that a new atomizer be bought in the near future so as to keep up cleanliness of the school premises.

Meeting of Health Corps. (Number missing)

Date: March 10, 1933.

Lieutenant-Commander Liu presides at the meeting.

Record taken by Chin.

Fifteen members present.

Lieutenant-Commander Liu says: "Commander Tien should preside today. But he is not able to come, so I have called the meeting. I feel much honored by your presence. Our school has paid attention to hygiene for a long time. We have obtained good results. I hope that in the future at each daily inspection for cleanliness we will be careful and strict. In case someone is found to have not washed his face or hands, please report to the teacher at once for punishment. Punishment of one will be a warning to the rest of us."

Incidentally, the training in student organization, group action, and mutual help also contributed greatly to the aid of general health education.

For classroom instruction, we have written two books of "Health Education Guide to Teachers," one for first grade, and the other for second grade. The reason we have laid special emphasis on the first two grades has been referred to. The first book takes cleanliness as its central objective, and the seventeen lessons in it are all written as stories. The titles of the lessons are as follows:

1. I like to be clean (on cleanliness of fingernails)
2. Take baths often
3. Keep nose and hands clean
4. Use handkerchief
5. Use individual basin and towels
6. Wash hair
7. Wash hands before meals
8. Eat regular meals
9. Chew food carefully
10. Drink plenty of water
11. Drink only boiled water
12. Use individual cup for drinking
13. Move bowels regularly
14. I love sunshine
15. I sleep with windows open
16. Prevent ringworm of scalp
17. Prevent serious disease (scarlet fever as illustration)

These lessons may be classified into three varieties. One kind is to be put into immediate practice such as "keep nose and hands clean;" another kind is to stimulate children's desire for better practice that may be possible for some children, such as "use handkerchief." The third is to cultivate a desirable attitude in health protection, such as "prevent ringworm of scalp." Each is correlated with a little drawing in which, unlike ordinary textbooks with pictures, children are provided with opportunities to take an active part. The second book is written with growth as its central objective. It is an activity program and is widely correlated with music, drawing, arithmetic, and letters. The lessons in it have the following titles:

1. Beauty of growth (correlation with drawing)
2. Measurement of growth (correlation with extracurricular activity)
3. Units of measurement (correlation with arithmetic)
4. Growth and posture (correlation with handwork)

5. Training in posture (correlation with physical education)
6. Vegetables
7. Vegetables (continued)
8. Vegetables (continued)
9. Bean products
10. Aesthetic aspect of growth (cleanliness)

Lessons in the second book do not strictly adhere to time limits. Generally it requires about twenty periods of thirty minutes to complete each lesson.

The two books give the basic amount of health training material that every teacher may use for children in the first and second grades. The work can be very cheaply done because textbooks for children are not needed. So far these books were well received by the teachers here, and for measurement of effectiveness of the health teaching, two methods have been used. One is a broad measurement of all school health work including health training, that is, measurement of absenteeism due to sickness, the other is strictly for measuring health knowledge. The results of both may be briefly given in Table 5.

In terms of percentage of absenteeism due to sickness and its various complaints, a distinct decrease has been demonstrated. This can hardly be explained without considering the probable influence of the health training work. Nine hundred

Table 5. Reduction of absenteeism.

	1932 (Control)	1933
Total days of investigation	146	170
Total absenteeism in days	3,408	1,374
Percentage of absenteeism due to sickness	45.5	15.9
Medical complaints of absenteeism sickness:		
Eye trouble (per cent)	29.2	21.0
Headache (per cent)	22.1	16.9
Skin disease (per cent)	16.2	8.7

and thirty-six children who have had over fifteen lessons and 534 children who have used textbooks published by commercial companies were tested with a set of twenty-five questions.

Table 6. Importance of adequate health education material.

Question	Per Cent of Correct Answers 534 Children (Control Group) ¹	Per Cent of Correct Answers 936 Children (Test Group) ²
1	19.5	79.0
2	34.3	97.0
3	28.3	99.0
4	31.5	88.7
5	34.3	99.0
6	34.6	99.6
7	33.2	98.9
8	32.8	98.0
9	51.1	83.0
10	68.0	88.9
11	66.7	92.5
12	81.6	98.5
13	58.2	85.0
14	34.5	99.0
15	35.2	99.0
16	35.4	98.8
17	32.8	98.9
18	87.8	95.0
19	60.9	91.9
20	54.9	98.7
21	97.0	99.0
22	56.6	98.7
23	81.3	91.7
24	81.5	91.8
25	8.6	71.1

¹Commercial textbooks used.

²Ting Hsien material used.

The results are quite interesting (Table 6).

This shows that as far as dissemination of essential health knowledge is concerned, our "Guides to Teachers" are much superior to those of the commercial texts in the rural schools. Similarly, a test of twenty questions was applied to two groups, one taught by the nurse and the other by classroom teachers. The results which are quite different are given in Table 7.

It seems clear that the same information in the hands of different persons produces different results. For the time being, the

nurse seems to work out better than the teachers, but the latter can also use the texts to a considerable degree of success.

Judging from the foregoing indications we now feel fairly sure that the procedures of approach to the country schools

in their health aspect and the methods we have evolved from experimentation are effective and practical under existing social and economic conditions. Before I conclude, I shall say

a word more about supervision and rewards. At the present time, before local educational authorities take great interest in health education work, the supervision of a visiting nurse over teachers is indispensable. Furthermore, nurses, irrespective of the amount of professional training they may have, rarely know how to overcome present difficulties. A physician's supervision over them is quite necessary even in rural work, where medical supervision

Table 7. Difference in degree of success due to difference in teachers.

Question	Per Cent of Correct Answers Nurse (187 Students Tested)	Per Cent of Correct Answers Classroom Teacher (439 Students Tested)
1	100	52.9
2	100	74.7
3	98.4	55.4
4	99.5	74.7
5	98.4	40.6
6	100	56.7
7	100	53.3
8	99.5	37.8
9	97.9	41.5
10	99.5	44.9
11	98.4	34.9
12	100	76.8
13	100	52.4
14	98.9	48.3
15	99.5	53.3
16	100	57.9
17	94.5	51.0
18	100	52.6
19	99.5	50.1
20	100	49.7

plays only a small role. With regard to rewards to school or children, it is a very delicate question. In general, rewards to the school, not to the teacher, and rewards to the health corps, not to individual children, worked out satisfactorily in our experiment. Articles for reward should be useful in improving personal or community hygiene. For cleanliness, we use a star for A, a circle for B, and a cross for C, and individual praise should not go beyond what this kind of device gives.

The experiment as reported here, laying emphasis on education rather than on medical care, is inexpensive. Each school pays one dollar for a treatment box, thirty cents for two books of "Health Education Guide to Teachers," and one dollar per year for medical supplies and record forms. The Health Department pays \$240 for a nurse, and \$50 for transportation and rewards to schools and health corps. In other words, this program costs less than 25 cents per child per year, and should prove economically practical in most of our country schools of today as a first step in health education.

SECOND PROGRESS REPORT ON A STUDY OF FAMILY LIMITATION¹

by RAYMOND PEARL

IN the January, 1933, number of the *QUARTERLY* there was published a preliminary report on a large collection of data regarding the reproductive histories and contraceptive practices of a large sample of women delivered of the products of conception in hospitals in urban centers in the eastern United States. The plan and scope of the investigation were outlined sufficiently in the first report referred to, and therefore need not be further discussed here.

Since the first report every effort has been bent towards tabulating the great mass of detailed records (30,951 cases *in toto*). It is now possible to present a further progress report upon a sample of 6,000 cases, these being the first 5,000 cases in the order of their collection (and therefore including the 2,000 previously discussed) and the twenty-sixth thousand collected. The twenty-sixth rather than the sixth thousand was added for the purpose of seeing whether the later cases were giving statistical ratios similar to the earlier ones. Of these 6,000 cases, 4,945 pertained to married women living in wedlock, and these alone are considered here.

The statistical methodology of this report is the same as that of the first report except in one respect. This is that further study of the whole matter has led to the revision

¹From the Department of Biology of the School of Hygiene and Public Health of The Johns Hopkins University and the Division of Research of the Milbank Memorial Fund. This is an abstract of a paper presented at the Annual Meeting of the Boards of Counsel of the Milbank Fund in New York on March 14, 1934. The full report is published under the title "Contraception and Fertility in 4,945 Married Women. A Second Report on a Study of Family Limitation." *Human Biology*, May, 1934, Vol. 6, No. 2, pp. 355-401.

The author wishes to acknowledge with deep gratitude the continued financial support the Milbank Memorial Fund has given to this work.

of the method of calculating pregnancy rates.² In principle this pregnancy rate is the same as the original one used in our first report, except for the addition of a constant multiplying factor for ovulations, which as developed in the formula has the effect of confining the limits of variation of the pregnancy rate (and the live birth rate) between 0 and 100 per cent, and of making the physical interpretation of the rates more consistent and intelligible.

Table 1. Geographical distribution of cases in present sample.

State	Whites		Negroes	
	Num-ber	Per Cent	Num-ber	Per Cent
Illinois	1,056	25.2	66	8.6
Maryland	825	19.8	198	25.8
Pennsylvania	679	16.3	230	30.0
New York	572	13.7	120	15.6
Minnesota	328	7.9	4	.5
Missouri	173	4.1	58	7.6
Wisconsin	160	3.8	1	.1
Ohio	145	3.5	31	4.0
Tennessee	66	1.6	42	5.5
District of Columbia	49	1.2	..	..
Michigan	47	1.1	..	..
Indiana	46	1.1	2	.3
Kentucky	31	.7	15	2.0
Totals	4,177	100.0	767	100.0

GEOGRAPHICAL DISTRIBUTION

Table 1 shows the distribution of the women in the present sample by the states in which they were delivered of the products of their last pregnancy at the time of record.

Seventy-five per cent of the whites, and 80 per cent of the negroes in the present sample belong to the four states of Illinois,

Maryland, Pennsylvania, and New York. But the general scatter is sufficient so that it may fairly be said that the present data do not reflect solely the condition of any one small region of the country.

²Pearl, R.: Factors in Human Fertility and Their Statistical Evaluation. *Lancet*, Vol. II for 1933, pp. 607-611.

ECONOMIC STATUS

Table 2 shows the distribution of the women in the present sample relative to economic status. The classes are defined in detail in our first report³ (p. 377).

In comparison with the smaller sample of the first report³ (p. 387) the present sample shows generally a somewhat higher economic status in the case of the whites, and a slightly lower one in the case of the negroes. Thus in the case of the whites there are 12.2 per cent in the "very poor" class as against 12.5 per cent in the earlier sample; 46.7 per cent as against 50.6 per cent in the "poor" class; 32.5 per cent as against 34.2 per cent in the "moderate circumstances" class; and finally 8.6 per cent as against 2.6 per cent in the combined "well-to-do" and "rich" classes.

It was emphasized in our first report that the economic status distribution was probably distorted as a result of the fact that the data were collected during the lowest depths of the general economic depression. It was suggested³ (p. 387) that: "In many cases in the records skilled artisans, for example, who in good times would fall into the 'moderate circumstances' group, had been long unemployed and were in actual fact 'poor,' and in some cases 'very poor' at the time the records were made."

³Pearl, R.: Contraception and Fertility in 2,000 Women. *Human Biology*, September, 1932, Vol. 4, No. 3, pp. 363-407.

Table 2. Economic status of 4,945 families.

Class	Whites		Negroes	
	Num-ber	Per Cent	Num-ber	Per Cent
Very poor	510	12.2	347	45.2
Poor	1,951	46.7	381	49.7
Moderate circumstances	1,358	32.5	39	5.1
Well-to-do and Rich	358	8.6	...	...
Totals	4,177	100.0	767	100.0

It is now possible to bring support to this view from the more analytical tabulations that have been made from the present larger sample. Figure 1 distributes the material into three broad occupational classes, in accordance with the classification of occupations recently presented by the writer.⁴

By comparison of the percentages of Table 2 and Figure 1 it is seen that while 79 per cent of the white husbands fall into occupational classes I and II taken together only 41.0 per cent of the white families have an economic status in the combined "moderate circumstances," "well-to-do," and "rich" classes. The difference between these two percentages may be not unfairly taken as a rough index of the extent to which the depression reduced income and resources in the social group which the English call "middle class."

The occupational distribution of the whites in Figure 1 does not differ very widely from that of the total occupied male population of New York City in 1930 which was⁴ (p. 496): Class I, 18.7 per cent; Class II, 53.7 per cent; Class III, 27.6 per cent.

The difference between the white and negro occupational distributions is striking, but about what would be expected. Nearly three-quarters of the negroes fall in Class III, and an insignificant proportion in Class I.

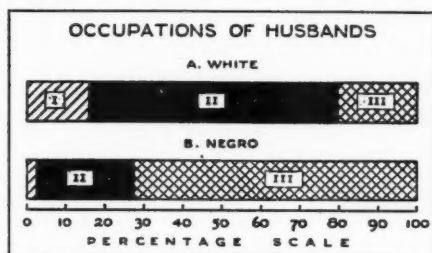


Fig. 1. Occupational distributions of husbands.

Class I=Owners, managers, officials, and professional men. Class II=Skilled and semi-professional workers. Class III=Laborers—unskilled and semi-skilled.

⁴Pearl, R.: A Classification and Code of Occupations. *Human Biology*, September, 1933, Vol. 5, No. 3, pp. 491-505.

RELIGION AND EDUCATION

Inasmuch as the frequency of the practice of contraception is presumably in some degree definitely correlated with the degree of general enlightenment of any population group, it will be well to present some data about the extent of the schooling experienced by the women in the present sample. This is done in Table 3, where education and religion appear in a double entry table, so that it may be possible to get at least some indication about the extent to which so-called religious prejudices against contraception are reinforced or weakened by ignorance or intellectual enlightenment. The entries in Table 3 are arranged in descending order of percentage attending college or university in the case of the whites; and in descending order of percentage attending high school in the case of the negroes.

That the populations from which this sample was drawn are urban is reflected in the fact that more than half the white women are either Catholic or Jewish. The relatively high percentage of Catholics is in spite of the fact that no specifically Catholic hospital was included in collecting the data. Amongst the negroes just over a half of the women were Baptists, and just over a quarter were Methodists.

It is to be understood that in Table 3 each denomination is inclusive of all its branches, sects, or churches. That is the Catholics include Greek and various other sorts of Catholics besides Roman. And the same thing is true for all the other specified denominations.

The most striking result from Table 3 is that in this whole sample of white women 61.6 per cent had never got beyond elementary schools. The implications of this fact are far-reaching in relation to their practice of contraception subsequently to be discussed. Any real or thorough understanding of the biological principles involved in the efficient use

RELIGION	HIGHEST STAGE OF FORMAL EDUCATION RECEIVED									
	Illiterate		Elementary		High School		College or University		Totals	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
A. WHITES										
Presbyterian	1	0.8	45	36.3	52	41.9	26	21.0	124	100.0
Episcopalian	..	..	62	45.6	53	39.0	21	15.4	136	100.0
All others not specified here	5	0.9	227	41.7	245	45.1	67	12.3	544	100.0
None	2	6.1	17	51.5	10	30.3	4	12.1	33	100.0
Methodist	4	1.1	177	47.6	154	41.4	37	9.9	372	100.0
Baptist	1	0.5	129	58.4	71	32.1	20	9.0	221	100.0
Jewish	26	4.0	328	51.1	253	39.4	35	5.5	642	100.0
Lutheran	2	0.5	288	66.4	125	28.7	19	4.4	434	100.0
Catholic	49	2.9	1,211	72.5	373	22.3	38	2.3	1,671	100.0
TOTALS	90	2.2	2,484	59.4	1,336	32.0	267	6.4	4,177	100.0
B. NEGROES										
Lutheran	..	..	..	..	3	100.0	..	..	3	100.0
Episcopalian	..	..	9	42.9	10	47.6	2	9.5	21	100.0
Presbyterian	..	..	7	58.3	5	41.7	..	..	12	100.0
Methodist	8	4.0	122	61.0	64	32.0	6	3.0	200	100.0
Catholic	4	6.8	38	64.4	16	27.1	1	1.7	59	100.0
All others not specified here	8	9.8	52	63.4	21	25.6	1	1.2	82	100.0
Baptist	13	3.4	272	70.2	89	23.0	13	3.4	387	100.0
None	..	..	3	100.0	..	..	..	..	3	100.0
TOTALS	33	4.3	503	65.6	208	27.1	23	3.0	767	100.0

Table 3. Extent of formal education of women in various religious denominations in the present sample.

of any contraceptive technique now known would seem to make a somewhat greater demand in the way of general intellectual enlightenment than is likely to be attained by such meager education as is afforded by our elementary schools, excellent as they no doubt are.

The highest percentage of college attendance in the white women is found among the Presbyterians, but they are a small group absolutely in this sample. The same also applies to the Episcopalians, who stand next in proportion of college attendance. The Catholics, who form the largest religious group in this sample, are the lowest group of all in the extent of their schooling.

MAGNITUDE OF EXPERIENCE

The concept of exposure to risk of becoming pregnant has been defined and discussed in detail in two earlier papers (*loc. cit.* footnotes 2 and 3 *supra*) and need not be further elaborated here.

The present sample of material, which represents about one-fifth our total data that will eventually be reported, includes:

- 14,666.6 person-years of exposure to risk of becoming pregnant, among the *whites*, and
- 2,838.7 person-years of exposure to risk of becoming pregnant, among the *negroes*, and
- 17,505.3 person-years of exposure to risk of becoming pregnant, for the *whole sample*.

These exposures indicate that the present sample is roughly equivalent to what one would get by observing the total normal reproductive activity of the population of a city of about the size of Buffalo for a period of one year.

THE FREQUENCY OF CONTRACEPTIVE EFFORTS

In our first report the objective of the investigation was stated to be to get some light on two questions³ (p. 367) as follows:

1. To what extent statistically is any sort of contraceptive technique, device, or habit actually practised in a

defined sample of the population of the United States at the present time?

2. What is the quantitative effectiveness exhibited by the various contraceptive techniques, considered both separately and all together, in reducing the relative frequency of pregnancy, as these techniques are actually used in a defined sample of the population of the United States at the present time?

Let us now see what the present sample of data contributes to the first of these questions.

In coding the extensive and manifold information on the original record cards a distinction has been made between contraceptive *genus* and *species*. By contraceptive genus is meant how, in general, contraception has been practised; and by contraceptive species what particular device or method or combination of devices and methods was used.

The categories into which contraceptive genus is classified are shown in the following code.

CONTRACEPTIVE GENUS CODE

Code No. Way in Which Contraception Was Practised

- B No information
- X Practice of contraception intermittent without indication of reason for intermittence
- 0 No contraception practised
- 1 Contraception regularly and steadily practised without intermittence
- 2 Contraception practice intermittent through carelessness
- 3 Contraception practice intermittent through dislike
- 4 Contraception practice intermittent through planning for children
- 5 Contraception practice intermittent through carelessness and dislike
- 6 Contraception practice intermittent through carelessness and planning

- 7 Contraception practice intermittent through carelessness and dislike and planning
- 8 Contraception practice intermittent through dislike and planning
- 9 Contraception practice intermittent for other reasons

For purposes of presenting the data here the classes of the contraceptive genus code have been combined into four broad groups as follows⁵:

Contraceptive Genus—Group A=Code No. 0=No contraception

Group B=Contraception regularly and steadily practised without intermittence. Code No. 1.

Group C=Code Nos. 4+6+7+8=Contraceptive practices intermittent for reasons wholly or partly connected with deliberate planning for children.

Group D=Code Nos. X+2+3+5+9=Contraceptive practices intermittent for reasons wholly other than deliberate planning for children (except for Code No. X, of which there were negligibly few cases).

⁵From a careful study of the original data it appears that, of these four Contraceptive Genus Groups, A is the most homogeneous, with D, C, and B following in the order named in comparative homogeneity relative to contraceptive practices and the motives and events lying behind the intermissions and failures of these practices. Contraceptive Genus Group B includes chiefly cases where contraceptive methods were regularly used without conscious or intended intermission for planned children or any other reason, but failed

(continued on page 257)

Table 4 suggests that generalizations regarding the proportion of whole populations of women who practise contraception can have but little real significance. In the present case it is of no great import to say that among the 4,166 white women of this whole sample 54.7 per cent did not practise contraception, when it is seen that in one differentiated group of these women 78.3 per cent made contraceptive efforts, while in another definitely differentiated group only 32.7 per cent made such efforts.

The rates of change in the proportion of white women practising contraception with improving economic status are worthy of more careful consideration. It should, however,

regularly or occasionally to prevent conception in fact. It was set up with the intention to include *only* such cases. But unfortunately this category also probably includes some (relatively few) cases where contraceptive practice was intermittent because of planning (and possibly for other reasons) but without the fact having been specifically so reported. Study of the original records indicates that the proportion of such cases is not large, and probably diminished steadily and almost to the vanishing point as the observers became better trained and more experienced in the course of the work.

Contraceptive Genus Groups C and D have been set up as they are for the purposes of this preliminary report solely as a practical expedient. In a sample of the size of the present one a number of the sub-groups in the Contraceptive Genus Code have too small frequencies to be of any significance by themselves. In the final analysis of the whole material each one of the 12 rubrics of the Contraceptive Genus Code will be dealt with separately, but to attempt this on a sample of less than 5,000, as the present sample is, would be futile.

The net result of lumping code numbers 6, 7 and 8 with 4 in this report is plainly to minimize the results as to the effect of intelligent and precisely performed contraception upon pregnancy and birth rates. The procedure adopted in setting up Contraceptive Genus Group C weights unfavorably the records of those women belonging to code number 4, who practise contraception carefully, intelligently, and persistently with intermissions only for planned and wanted pregnancies. The records of these code number 4 women are compelled by the present grouping to carry along the burden of the women who had the same intentions as they did, but were more careless in their performance. The errors made by so doing, insofar as concerns effects upon pregnancy and birth rates, will be in the direction of understatement rather than of exaggeration.

For further discussion of the grouping the reader must consult the complete report¹, of which this paper is an abstract.

CONTRACEPTIVE GENUS GROUP	VERY POOR		POOR		MODERATE CIRCUM- STANCES		WELL-TO-DO AND RICH		TOTALS	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
A. WHITES										
A. No contraception	343	67.3	1,191	61.2	669	49.4	77	21.7	2,280	54.7
B. Regular and steady practice of contraception	59	11.6	323	16.6	276	20.4	78	22.0	736	17.7
C. Contraceptive practice intermittent mainly for planned children	68	13.4	262	13.4	323	24.0	169	47.6	824	19.8
D. Contraceptive practice intermittent for reasons other than planning	39	7.7	172	8.8	84	6.2	31	8.7	326	7.8
Sub-totals (B+C+D). Contraception practised	166	32.7	757	38.8	685	50.6	278	78.3	1,886	45.3
TOTALS (A+B+C+D). All cases	509	100.0	1,948	100.0	1,354	100.0	355	100.0	4,166	100.0
B. NEGROES										
A. No contraception	263	76.0	275	72.2	31	79.4	..	..	569	74.3
B. Regular and steady practice of contraception	30	8.7	45	11.8	4	10.3	..	..	79	10.3
C. Contraceptive practice intermittent mainly for planned children	8	2.3	20	5.2	3	7.7	..	..	31	4.0
D. Contraceptive practice intermittent for reasons other than planning	45	13.0	41	10.8	1	2.6	..	..	87	11.4
Sub-totals (B+C+D). Contraception practised	83	24.0	106	27.8	8	20.6	..	..	197	25.7
TOTALS (A+B+C+D). All cases	346	100.0	381	100.0	39	100.0	..	..	766	100.0

Table 4. The practice of contraception in relation to economic status.

be kept clearly in mind that the absolute numbers are small in some of the sub-classes, and that in consequence final judgment as to the import of the figures should be reserved until the whole material, of which the present sample is only about a fifth, has been tabulated. With this reservation in mind we see from Table 4 that in this sample of white women the relative frequency of the practice of contraception regularly and without intermission (*Contraceptive Genus Group B*) rises steadily as economic status rises, but on the

whole not as fast or as far as does the practice of contraception which is intermittent for reasons that are in whole or in part connected with deliberate planning for children (*Contraceptive Genus Group C*). The practice of contraception that is intermittent for reasons that do not involve deliberate planning for children (*Contraceptive Genus Group D*) does not sensibly change as economic status rises. The frequencies for this type of contraceptive behavior are substantially horizontal. It relates chiefly to people who are intermittent in their contraceptive efforts through carelessness. It suggests that under the thralldom of the sexual urge the economically better off folk contain among their numbers a residue of about the same proportion of people who, though well intentioned about contraception, are reckless upon occasion. It will be extremely interesting to see whether this suggestion is borne out by the whole material when it is tabulated.

Amongst the negroes of the present sample the relationship between contraceptive efforts and economic status appears to be somewhat less marked than among the whites, a result that accords with general expectation. But a definite conclusion on the point is not warranted yet. In view of the facts, first, that the proportion of negro women who have ever made any contraceptive efforts is much smaller than among the whites; and, second, that our total sample of negroes so far tabulated is small, it results that in the contraceptive genus groups for negro women practising contraception the numbers are generally too small to yield reliable percentages.

In the present sample 1,583, or 38.0 per cent, of the white women had experienced pregnancy but once in their lives up to the time of record, while the remaining 2,583, or 62.0 per cent, had experienced two or more pregnancies. Among the negroes the corresponding figures are 201, or 26.2 per

cent, women who had experienced their first (and only) pregnancies; and 565, or 73.8 per cent, who experienced two or more pregnancies. It thus appears that this sample of women delivered in hospitals is not only heavily weighted with first pregnancies (and first births) but that the whites are more heavily weighted in this series than the negroes. It is important to see what effect this has upon contraceptive practices.

An analysis of the data on the point suggests that:

1. The percentage of women *not practising* contraception is *higher* among the primigravidae than among those who have been pregnant two or more times. This is true for both whites and negroes, and within each economic group. The differences in both races are largest in the very poor class, tend to become progressively smaller in the higher economic classes, and are, in the whites, smallest in the well-to-do and rich class.

2. Conversely the percentage of women *practising* contraception is *lower* among the primigravidae than among those who have been pregnant two or more times, in both whites and negroes and in all four economic classes.

Furthermore, the figures for the women in this sample who made contraceptive efforts of some sort suggest that general dumbness about contraception (and presumably other things) is no exclusive prerogative of any particular economic class. In fact it would seem to be rather evenly distributed amongst the women of this sample practising contraception who had experienced but one pregnancy. Women who had experienced two or more pregnancies appear generally sharper-witted and more intelligent in their practice of contraception than those who had experienced but one, as might reasonably be expected *a priori*. This is especially true of women in the well-to-do and rich class.

The women in Contraceptive Genus Group C, who practise their contraception intelligently and for the most part effectively, are proportionately more numerous in the higher than in the lower economic classes; and except for the very poor class, are more numerous relatively among those in any given economic class who have experienced two or more pregnancies than among the primigravidae. Again these are results which might reasonably have been expected *a priori*. Women who are careless about doing their contraception (*Contraceptive Genus Group D*) diminish in relative frequency as we go up in the economic scale, but are relatively about as numerous, on the whole, among those who have experienced two or more pregnancies as among those who have had only one pregnancy. These results again seem about what might reasonably be expected *a priori*. Carelessness and indifference about so grave a matter as creating more human beings are probably matters of character, bred in the bone, and unlikely to be rapidly altered by experience.

Finally the last column of the table reveals a somewhat significant fact. It appears that if we take all the women together, regardless of both economic condition and experience in reproduction, somewhat less than half of the white women in this sample who practise contraception did it intelligently, precisely, and effectively, using the word "effectively" in the sense of meaning the one-hundred-percent achievement of the objective which they (the women) set out to obtain by the practice of contraception. In the well-to-do and rich class the case is different. There a much higher proportion of the women fell in our Contraceptive Genus Group C.

CONTRACEPTIVE SPECIES

Table 5 gives, for the white women, the distributions (absolute and relative) of contraceptive species according

to contraceptive genus groups, for the total usage (alone or combined) of each method or device. The items are arranged in descending order for Contraceptive Genus Group C (contraceptive practice intermittent mainly for planned children).

It is apparent from Table 5 that the particular methods and devices for contraception employed by this sample of white women varied considerably according to their general mode of using them (contraceptive genus). The women falling in Contraceptive Genus Group C who by and large do their contraception intelligently and carefully, intermitting it only for planned children, favor most the condom. This is undoubtedly because it is the most reliable method known to these women, who for the most part have never had formal, scientific instruction in contraception. In this same Group C coitus interruptus comes next in frequency of usage, and this is followed in turn by medicated douches.

The women of Contraceptive Genus Group B (regular and steady practice, but failing mainly through ignorance and stupidity about contraception) rely most heavily upon medi-

Table 5. Methods and devices used for preventing conception by white women, according to contraceptive genus groups.

CONTRACEPTIVE SPECIES	CONT. GENUS GROUP B		CONT. GENUS GROUP C		CONT. GENUS GROUP D	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Condom	227	19.6	408	32.5	130	25.9
Coitus interruptus	223	19.3	272	21.7	92	18.4
Douche alone—medicated	337	29.1	243	19.3	125	24.9
Douche alone—water	225	19.4	148	11.8	87	17.4
Medicated vaginal suppositories or jellies	64	5.5	103	8.2	24	4.8
"Safe period"	40	3.5	35	2.8	15	3.0
All other methods together	41	3.6	47	3.7	28	5.6
TOTALS	1,157	100.0	1,256	100.0	501	100.0

cated douches, with condom, coitus interruptus, and plain water douches following, each with about equal frequency.

The careless couples in Contraceptive Genus Group D depend about equally upon the condom and medicated douches, but less on the former and more on the latter than those in the Genus C group.

PREGNANCY AND BIRTH RATES

What are the pregnancy rates, and birth rates of defined groups of women endeavoring in various ways to practise contraception or not attempting to practise it at all, and how do these rates differ among themselves?

We shall now proceed to exhibit the data of the present sample arranged in such form as to show their bearing upon this question. In the following discussion *pregnancy rate* means "number of pregnancies per 100 computed ovulations." *Live birth rate* means "number of live births per 100 computed ovulations."

Table 6 gives the mean pregnancy rates of the women in the present sample, together with their probable errors, tabulated by contraceptive genus groups and economic status. Thus in the upper left hand corner cell of Table 6 the figure 14.02 ± 0.62 means that the group of white married women in this sample who did not practise contraception and were very poor had an average pregnancy rate of just over 14 per cent.

Since Table 6 embodies the most interesting and significant results of the present report they are exhibited for the white women in graphic form in Figure 2. If the reader will study this diagram he may find it easier to grasp the general purport of the somewhat complicated figures of Table 6.

From Table 6 and Figure 2 the following significant results emerge:

CONTRACEPTIVE GENUS GROUP	VERY POOR (Per Cent)	POOR (Per Cent)	MODERATE CIRCUM- STANCES (Per Cent)	WELL- TO-DO AND RICH (Per Cent)	TOTALS ALL WOMEN IN GROUP (Per Cent)
A. WHITES					
A. No contraception	14.02 \pm 0.62	16.00 \pm 0.38	13.59 \pm 0.46	16.97 \pm 1.89	15.03 \pm 0.26
B. Regular and steady practice of contraception	8.77 \pm .92	10.56 \pm .50	8.63 \pm .46	9.71 \pm .88	9.60 \pm .31
C. Contraceptive practice intermittent mainly for planned children	6.32 \pm .40	7.27 \pm .32	6.55 \pm .27	5.16 \pm .28	6.48 \pm .16
D. Contraceptive practice intermittent for reasons other than planning	8.59 \pm 1.25	10.41 \pm .65	9.67 \pm .84	8.87 \pm .89	9.85 \pm .44
B. NEGROES					
A. No contraception	14.03 \pm 0.74	14.67 \pm 0.71	18.24 \pm 2.55	....	14.57 \pm 0.51
B. Regular and steady practice of contraception	10.42 \pm .84	10.83 \pm 1.40	21.35 \pm 5.35	....	11.20 \pm .92
C. Contraceptive practice intermittent mainly for planned children	5.63 \pm .58	9.25 \pm .64	9.17 \pm 1.84	....	8.30 \pm .51
D. Contraceptive practice intermittent for reasons other than planning	9.22 \pm .88	9.33 \pm .86	....¹	....	9.45 \pm .62

¹Only one woman in this class, with a pregnancy rate falling in the class 20.0-29.9 per cent.

Table 6. Mean pregnancy rates for 100 computed ovulations in all married women in the present sample, by contraceptive genus group and economic status.

1. The mean pregnancy rates of white women in this sample who had not practised contraception at all (*Contraceptive Genus Group A*) are substantially similar in all economic status classes. The greatest difference between any two classes in average pregnancy rates is that between the moderate circumstances and the well-to-do and rich classes, and amounts to 3.38 ± 1.95 , a statistically insignificant difference. The next greatest difference is that between the moderate circumstances class and the poor. This amounts to $2.41 \pm .60$. This is probably a "statistically significant" difference, but seems absolutely too small in amount to have any particular biological significance. The very poor class has nearly the lowest mean pregnancy rate and the well-to-do and rich class the highest mean preg-

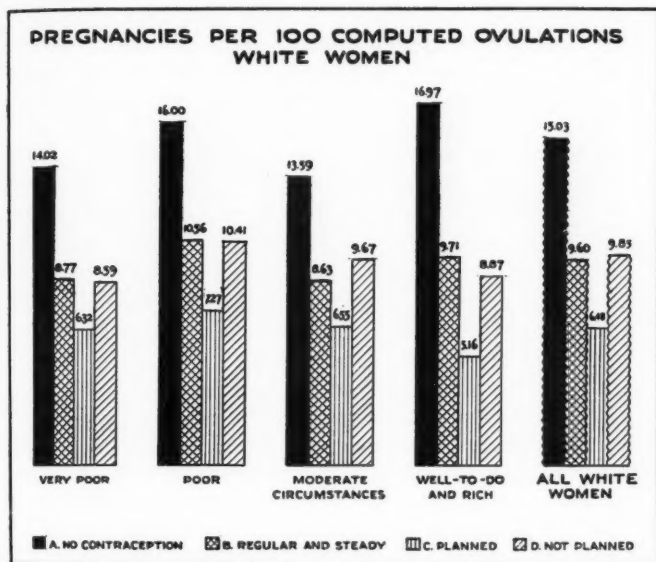


Fig. 2. Showing for the different economic status classes and contraceptive genus groups the mean pregnancy rates per 100 computed ovulations.

nancy rate among the white women not practising contraception. While this result does not accord with popular preconceptions, and as had been noted the difference in any case is not statistically significant, its trend is in agreement in principle with the results of Edin⁵ for the Stockholm population.

2. The white women belonging to the Contraceptive Genus Group C (contraceptive practice intermittent mainly for planned children) in this sample display an average pregnancy rate for the whole sample that is only 43.1 per cent of that shown by women not practising con-

⁵Edin, K. A.: Fertility in Marriage and Infantile Mortality in the Different Social Classes in Stockholm from 1919-1922. *Proceedings World Population Conference*, London (Arnold), 1927. pp. 205-207.

Id. The Birth Rate Changes. Stockholm 'Upper' Classes More Fertile Than the 'Lower.' *Eugenics Review*, 1929, Vol. 20, pp. 258-266.

traception at all, a reduction of about 57 per cent. In the women of the well-to-do and rich class the Contraceptive Genus Group C mean pregnancy rate is only 30.4 per cent of that of the women in the same economic class not practising contraception at all. This reduction of approximately 70 per cent in the average pregnancy rate associated with the relatively intelligent and careful practice of contraception is a very substantial lowering indeed. The mean pregnancy rate is lowered least (about 52 per cent) in association with Contraceptive Genus Group C in the moderate circumstances class, but the reduction is of approximately the same order as this in both the very poor and poor classes.

3. Taking the white women in this sample as a whole group the mean pregnancy rates in Contraceptive Genus Groups B and D are roughly about 65 per cent of those exhibited by the women not practising contraception at all, showing in other words a reduction of only about 35 per cent as compared with the 57 per cent shown by the women of Contraceptive Genus Group C. Careless and unintelligent contraceptive efforts, in short, have associated with them in this sample of women a smaller reduction in the mean pregnancy rate than do careful and intelligent efforts.

4. The mean pregnancy rates of the white women in this experience are extraordinarily similar in each economic class, for the same contraceptive practices. To put it another way, if we were to connect the tops of each set of similarly hatched bars in Figure 2, we should have a series of nearly horizontal lines, only deviating from horizontality by amounts generally well within the range of expected fluctuations of sampling. The horizontal lines would, however, be at different levels, associated with the modes of contraceptive practice which they designated. What this suggests biologically is that the innate natural fertility of these women is about the same in the different economic classes here distinguished, and that the differences in average *expressed* fertility observed in the differ-

ent economic classes are due mainly to different degrees of artificial alteration of the innate natural fertility. On the basis of the present material this conclusion seems clear and indubitable, but it will be well to reserve final judgment on the matter until the other four-fifths of our whole material has been tabulated.

5. The lower half of Table 6 dealing with the negro women shows in general, and within its limitations imposed by the smaller size of the sample, the same kind of relationships as those just discussed for the whites. The chief difference is that the lowering of the mean pregnancy rates among the women of Contraceptive Genus Groups B, C, and D, as compared with Group A, is generally not quite so large in amount as in the white women. But the outstanding and somewhat surprising result is the general likeness between the white and the negro tables. This is so marked that it seems unnecessary to display the negro figures graphically.

6. Comparing negro and white groups as wholes it appears that the negro women who did not practise contraception at all in this sample have a mean pregnancy rate almost identical with that of the white women in the same category. The mean rate for the negro women is actually slightly lower than that for the whites but no significance is to be attached to the slight difference. The average negro rates do, however, lend additional support to the view expressed above that these data suggest that innate natural fertility uninfluenced by artificial alterations appears to be about the same for all groups of women into which this material has been divided. If substantiated by further data this would mean that the reason for the frequently observed higher birth rates of negroes might be sought in the fact that as a racial group they practise contraception much less frequently than whites, and somewhat less intelligently and carefully when they do practise it.

7. The lowest average pregnancy rate among negro women not practising contraception at all is in the very poor class, and the highest in the moderate circumstances

class. This agrees in principle with the findings in the whites, but the difference is not statistically significant having regard to its probable error.

8. Taking the negro group as a whole, the average pregnancy rate is below that of the women not practising contraception at all, by about 23 per cent in those belonging to Contraceptive Genus Group B; by about 43 per cent in those belonging to Contraceptive Genus Group C; and by about 35 per cent in those belonging to Contraceptive Genus Group D.

If live birth rates instead of pregnancy rates are analyzed they lead to the same results as those stated above, in all essential particulars.

CONCLUSION

The general picture is of a state of affairs where a high proportion of the economically most fortunate classes are practising contraception with a relatively high degree of precision and intelligence, producing mainly only as many babies as they want and when they want them. On the other hand the less and particularly the least fortunate economic classes, in this material certainly, are to a much smaller extent making any attempt to practise contraception at all, and of those who are making the attempt the proportion who are doing so intelligently and precisely is also smaller. Our detailed records indicate clearly that *this is due primarily to ignorance of contraceptive methods and technique*, rather than to a desire to have large families. Hundreds and hundreds of the women in this sample who do not practise contraception are pleading for information and instruction so that they may.

The logic of our results would seem to point clearly and unequivocally to the probability that prompt removal of all legal restriction to the free dissemination of contraceptive information, and barriers to the unrestricted distribution of

contraceptive devices, would tend to have the effect of bringing the differential fertility of social classes more nearly into balance again. Whether this would be a "good" or "desirable" thing to do is a matter of opinion, to which our results *per se* make no contribution. Therefore that question will not be discussed. But it seems clear that if restrictions upon the dissemination of contraceptive information and advice were removed, it might somewhat lighten the burden of poverty and unemployment with which our children and grandchildren bid fair to be faced.

A STUDY OF THE CHINESE POPULATION¹⁶

by CHI-MING CHIAO

CHAPTER VI

DEATH RATE

THE crude death rate must be used with the same care as the crude birth rate. It indicates simply the proportion of the population that has died during the year and is influenced by the age and sex composition of the population as well as by the specific mortality hazards to which the constituent classes of the population are exposed. For example, the population of France which has been about stationary for several decades has an age distribution less favorable to a low crude death rate than that of a new country like the United States, where high birth rates and immigration have yielded a relatively young population. It is important to bear the composition of the population in mind when interpreting the crude death rate.

The death rate for China was 25.7 per thousand living persons; for the North it was 24.2 and for the South 26.8 (Table 25). The higher death rate in the South was not due to a less favorable age distribution. In fact, as was pointed out in Chapter III, the age distribution of the Southern population is more favorable to a low death rate than that of the North. The crude death rate, therefore, masks somewhat the higher mortality of the South.

The reason for the higher death rate in South China is that conditions are more favorable to the spread of disease.

¹⁶From the Department of Agricultural Economics of Nanking University, and the Division of Research, Milbank Memorial Fund. This study was made in cooperation with the Land Utilization Project financed by the China Council of the Institute of Pacific Relations. These chapters conclude Mr. Chiao's study. The first five chapters have been presented in the October, 1933, January and April, 1934, issues of the *Quarterly*.

DEATH RATES, DEATHS, AND LIVING POPULATIONS	CHINA	NORTH CHINA	SOUTH CHINA
Deaths per 1,000 living			
Both sexes	25.7	24.2	26.8
Male	24.6	21.0	27.4
Female	26.8	27.8	26.1
Deaths			
Both sexes	1,736	725	1,011
Male	867	328	539
Female	869	397	472
Living population			
Both sexes	67,643	29,909	37,734
Male	35,262	15,617	19,645
Female	32,381	14,292	18,089

Table 25. Crude death rates by sex; 12,456 farm families, 22 localities, 11 provinces, China, 1929-1931.

Unclean drinking water in the South is responsible for more disease than in the North, because it is taken from rivers and ponds, while in North China most of it comes from wells. Mosquitoes and flies, important agents in the spread of disease, are also more common in the South than in the North where the climate is drier and colder.

Apparently in the case of the females, the benefits of a better environment in the North are counterbalanced by other factors, for we find on examining Table 25 that the lower death rate of the North was due to the fact that the death rate for males was considerably lower in the North than in the South. For females, on the other hand, the rate was a little higher in North than in South China. However, the higher death rate for females in the North was due entirely to an excessively high female infant mortality. When, as in Table 26, the death rates are computed for the population one or more years of age, the female mortality is also found to be a little lower in North than in South China.

DEATH RATES, DEATHS AND LIVING POPULATION	CHINA	NORTH CHINA	SOUTH CHINA
Deaths per 1,000 living for persons one or more years of age			
Both sexes	20.6	17.8	22.8
Male	19.9	15.4	23.5
Female	21.3	20.4	22.0
Deaths at one or more years of age			
Both sexes	1,348	514	834
Male	680	232	448
Female	668	282	386
Population one or more years of age			
Both sexes	65,464	28,930	36,534
Male	34,103	15,079	19,024
Female	31,361	13,851	17,510

Table 26. Death rates for persons of each sex one or more years of age; 12,456 farm families, 22 localities, 11 provinces, North and South China, 1929-1931.

The mortality hazard for Northern females even after infancy is unfavorable compared with that of males. In South China the female death rate was if anything lower than that for males, but in North China it was almost one-third higher. The explanation is that the social status of females is lower in North than in South China. Special care before or after the women give birth to children is better in the southern part of China than in the northern section. For instance, in the South, the food given mothers after childbirth consists of eggs, chicken soup, hog kidney, and rice cangee; but in North China usually the mother is not permitted to eat any animal products such as eggs and meat soups, and is given only diluted millet soup. The undernourishment of the mother may be a factor in the high female death rate of North China.

China has the highest death rate but one of all the countries listed in Table 27. In India, mortality hazards appear to be greater than in the Chinese population under considera-

Table 27. Crude death rate for various countries, 1930.

Country	Death per 1,000 Population 1930
China	25.7 ³
India ¹	38.4 ⁴
Japan ²	20.0 ⁵
Soviet Republics ²	18.8
United States ²	11.9 ⁵
Great Britain and Ireland ²	11.8
England and Wales ²	11.4
France ²	15.7
Germany ²	11.1
Sweden ²	12.2

¹Thompson, W. S.: *Population Problems*. New York, McGraw-Hill Book Company, Inc., 1930, p. 135.

²Official Year Book of the Commonwealth of Australia, No. 24, 1931. H. J. Green, Government Printer, Canberra, p. 705.

³1929-1931.

⁴1916-1920.

⁵1929.

tion. The death rate (1916-1920) was definitely higher and the populations have similar age distributions (Chapter III). The rate for China is most nearly approached by the rates for Japan (20.0) and the Soviet Republics (18.8) and is about twice as large as those for all the other Occidental countries except France where an unfavorable age distribution accounts in part for the relatively high death rate.

INFANT MORTALITY

Infant mortality is usually a sensitive index of economic and sanitary conditions as they affect the health of the population. An infant is defined as a child under one year of age, and infant mortality is usually measured by the number of infant deaths per thousand live births in a year.

The infant mortality rate was 157 for China, 186 for North China, and 132 for South China (Table 28). The rates for each sex were higher in the North than in the South but for male babies the rate was only 20 per cent higher while for female babies it was 65 per cent higher in the North. Since the death rate for persons of each sex over one year of age

INFANT MORTALITY RATES, INFANT DEATHS, AND BIRTHS	CHINA	NORTH CHINA	SOUTH CHINA
Deaths under one year of age per 1,000 live births			
Both sexes	157	186	132
Male	144	158	131
Female	171	218	132
Deaths under one year of age			
Both sexes	388	211	177
Male	187	96	91
Female	201	115	86
Live births			
Both sexes	2,479	1,134	1,345
Male	1,301	607	694
Female	1,178	527	651

Table 28. Infant mortality rates by sex; 12,456 farm families, 22 localities, 11 provinces, China, 1929-1931.

was lower in North than in South China, it seems probable that the excessively high infant mortality rates found in the North are not so much the result of an unhealthy environment as of the traditional carelessness and neglect with which parents treat babies in general and girl babies in particular.

China has the highest infant mortality rate of all the countries listed in Table 29. Its rate is only approached by

Table 29. Infant mortality and crude birth rates for various countries.

Country	Infant Deaths per 1,000 Live Births 1930	Crude Birth Rate 1930
China	157 ²	36.6
Japan ¹	142 ³	33.0
United States ¹	68 ³	18.9
Germany ¹	84	17.5
France ¹	79	17.7
Great Britain and Ireland ¹	76 ³	16.8
England and Wales ¹	60	16.3
Sweden ¹	60 ³	15.2

¹Official Year Book of the Commonwealth of Australia. No. 24, 1931. H. J. Green, Government Printer, Canberra, p. 707.

²1929-1931.

³1929.

that of Japan which, though twice as high as the rates of several Western countries, is somewhat lower than that for China. Of the Western countries Germany has the highest rate (84) and Sweden and England and Wales have the lowest rates (60). It is of some interest to note that while the two Oriental countries have infant mortality rates about twice as high as Western countries, their birth rates are also about twice as high. The association of high infant mortality with high birth rates, and low infant mortality with low birth rates appears to be universal.

CHAPTER VII

RATE OF NATURAL INCREASE AND FUTURE TRENDS

THE rate of natural increase of the population is found by subtracting the crude death rate from the crude birth rate or by dividing the excess of births over deaths by the population. The rate of increase was 10.9 per thousand inhabitants for China, 13.7 for North China and 8.8 for South China (Table 30). The higher rate for the North reflects, of course, the higher birth rate and lower death rate of that section of the country.

Of the countries for which the rates of natural increase are given in Table 30, China has the third highest. It is exceeded only by the extraordinary rate of 22.3 for the Soviet Republics and by a rate of 13.7 for Japan. In the latter country, a lower birth rate than that found in China is more than counterbalanced by favorable mortality rates. In each of the other countries the rates of increase are lower than in China, ranging from 8.7 in the United States with its relatively young population, to 1.1 in France where the population has been practically stationary for several decades.

Let us think what it means to China to have an annual rate of increase of 10.9 per 1,000 inhabitants. If the rate is

COUNTRY	YEAR	NATURAL INCREASE PER 1,000 POPULATION	NUMBER OF YEARS REQUIRED FOR THE POPULATION TO DOUBLE AT CURRENT RATES OF INCREASE
China	1929-1931	10.9	64
North China	1929-1931	13.7	51
South China	1929-1931	8.8	79
Japan ¹	1926-1930	13.7	51
Soviet Republics ¹	1926-1927	22.3	31
United States ¹	1925-1928	8.7	80
England and Wales ¹	1926-1929	4.3	161
France ¹	1926-1929	1.1	631
Germany ¹	1925-1928	7.5	93
Sweden ¹	1926-1929	3.0	178

¹Official Year Book of the Commonwealth of Australia. No. 24, 1931. H. J. Green, Government Printer, Canberra, p. 661.

Table 30. Rates of natural increase for various countries.

really representative of all China the total population increase is probably between four and five million persons a year. If this rate of increase were to continue unchecked, it would require only 64 years for the population to double. North China would double its population in 51 years and South China in 79 years. On the same doubtful assumption, which nevertheless graphically pictures the forces at work, the Soviet Republics would double their population in 31 years and Japan its population in 51 years. All of the other countries would require a much longer time, ranging from 80 years for the United States to 631 years for France. Actually, of course, nothing of the sort is likely to take place. A simple annual rate of increase is not an adequate instrument for predicting future annual rates of increase. In the absence of radical technological and cultural changes, the very growth of the population sets at work new forces which modify the rate of growth long before well-populated areas double the number of their inhabitants.

POSITIVE CHECKS ON POPULATION

It is most unlikely that the rates of natural increase found in this study could continue, for they were obtained from regions in which during the survey year the most drastic positive checks on population were not operating. One could scarcely imagine China with twice its present number of inhabitants. The cultivated land area per capita in China not only does not increase but seems to decrease year after year. Available statistical data show that the cultivated land per capita was 3.8 mou (one mou equivalent to one-sixth acre) in 1766, 3.4 mou in 1812 and 3.3 mou at the present time.¹⁷

Let us imagine a country where there is available for each person only 3.3 mou of land worked by primitive agricultural methods, and where crop production is frequently checked by drought and flood. In such conditions, most of the farmers do not have enough land to produce sufficient food in good years to provide for the bad years. Therefore, when famine comes, many people must starve. The immediate causes of famine in China may be said to be flood, drought, and war, but the indirect cause of famine is overpopulation.

Professor J. O. P. Bland in *HOUSEBOAT DAYS IN CHINA* says:¹⁸

"One cannot see a Chinese village and its inevitable pullulating horde of children without realizing the vital problem of the East, a problem so immediate and tremendous that it dominates the mind like an evil dream. . . . The picture is the same from one end of the country to the other; cities and villages innumerable taking their toll of the land, hamlets huddling even closer in valleys,

¹⁷Howard, Harry Paxton: *Op. cit.*, pp. 245-267.

¹⁸Bland, J. O. P.: *Houseboat Days in China*. London, William Heinemann, Ltd., 1909, p. 81.

where every field already supports more lives than would be possible in any other country except India; a third of humanity struggling hopelessly and unceasingly to procreate and maintain its swarm of predestined hungry ones. And for these there is no outlet; the untilled lands beyond the seas will have none of them; here they must live somehow or die . . . and so the inexorable law works out its own pitiless solution, and they go down, these superfluous lives, by millions, to fatten the tired earth which could not fatten them. The whole sorry tragedy goes on before our eyes; infanticide, rebellions and diseases, swift slaying of famine or slow starvation."

This quotation gives a complete picture of the Chinese population problem. The increase of population simply adds more pain and sorrow to the individual family and to society each year. There is a common saying among Chinese that "within thirty years there will be a small strife, and within fifty years there will be a big disaster." When the population increases for thirty to fifty years, some strife, disorder, or calamity must come to decrease it.

Beside the above general observation on the Chinese population problem, there are some concrete facts which indicate the positive checks to Chinese population growth during the last decade. Mr. Shi-Heng Li¹⁹ in his book HU KAU TUNG LWEI states that:

"During the period of the Taiping rebellion there were more than 30,000,000 persons slain. In 1894 to 1895 in the Mohammedan Rebellion at Kansu there were 250,000 persons killed. In the years of 1810, 1811, 1846, and 1849 several famines occurred in wider areas of North China. About 45,000,000 persons starved. During 1877 famine covered three entire provinces of North China. There were approximately 9,500,000 persons dead from food shortage. In 1888 as a result of the break of the Yellow River there were ap-

¹⁹Li, Shi-Heng: *Hu Kau Tung Lwei*. Shanghai, The World Book Company.

proximately 2,000,000 persons drowned. In 1892 to 1894 there was a big drought in the province of Shansi, Shensi, Chili, and Mongolia, and the deaths of the people were enormous in number."

From 1911 to the present time, many famines have been due to drought, flood, civil war, and deaths have been estimated to include at least 5,500,000 persons.

When these calamities are considered, over-population appears to be the most important single factor in their explanation. If China does not limit her population increase, she will have no peace.

What, then, is the probable future trend of population in China? No single answer can be given to this question, since there are too many factors involved. Dr. Warren S. Thompson²⁰ in his book on "Population Problems" states:

"As for actual prediction as to what will be China's growth during the next half century, one can only hazard a guess. It seems highly probable that there will be considerable further expansion into Manchuria and Inner Mongolia. Perhaps 20,000,000 to 30,000,000 more people may live there 50 years hence than at present. But who can say when civil war will cease in China? Who can say when China's transportation system will be sufficiently developed to carry food to famine-stricken areas? Who can say how rapidly industrialization will proceed and great cities will develop, and whether industrialization in China will have as depressing an effect on the birth rate as in the west? Who can say whether the Chinese will be allowed to settle upon, or will become strong enough to take, some of the unused lands of the earth to provide homes for increasing numbers? Who can tell how long it will be until better medical care and sanitary practices shall bring the death rate largely within man's control? Who knows how much additional land there is in China, that can be profitably tilled when modern agricultural machinery becomes avail-

²⁰Thompson, W. S.: *Op. cit.*, pp. 227-228.

able? Finally, who can tell how long the Chinese family system will withstand the onslaught of industrialism and thus delay the spread of contraception?

"These are by no means all the important factors in China's situation about which we should know more, but they will serve to indicate the difficulty of predicting the growth of China's population for even a very brief period in advance. On the whole, it seems rather probable that, aside from the expansion of the Chinese through colonization in Manchuria and Mongolia, there is little likelihood of any considerable change in China's population within the next few decades."

If Dr. Thompson's idea is correct, probably some population increase can be absorbed through colonization in Manchuria and Mongolia, but with the formation of the new state in Manchuria in 1931, Manchurian colonization is problematical. It will be difficult to increase China's population except in adjustment to the principle of struggle for existence and survival of the fittest. War, pestilence, drought, and flood seem to be the only way to eliminate the excess of Chinese population at present. Peace and order in China will be difficult to maintain so long as each year adds four to five million potential trouble-makers.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

THE main purpose of this study is to determine the composition and growth of the Chinese farm population during a normal year.

The "joint family" system in which sons tend to live with their wives in the homes of their parents prevails in the rural population of China but this tendency is stronger in the North than in the South. In the absence of parents, brothers tend to separate and maintain their own homes. For China

the mean size of the family is 5.25 and of the household 5.43. The families and households were somewhat larger in the North than in the South where improved means of communication and industrialization are breaking down the patriarchal family.

A larger proportion of the Chinese population, as compared with the populations of Western countries, are young and middle-aged and a smaller proportion are over 50. This is due to the high birth rate and relatively short span of life in China.

The ratio of males to 100 females is 109 for China, North China and South China respectively. The irregularities of the sex ratio in the different age groups are caused chiefly by under-reporting of younger children, deaths from diseases especially for females, and migration of males.

The age distribution of persons married during the year studied shows that the girls are married in greatest proportion when under 20 years of age and that the men marry a little later than women. Poverty is the chief cause of later marriage among men, but custom dictates that girls should be married by 20 years of age. The average age at marriage in China for males is 20.19 years and females, 18.82 years. The marriage rate in China is 7.86 per 1,000 living population, which is not higher than that found in most countries.

China has a high birth rate of 36.6 and a high death rate of 25.7. Both the birth rate and the death rate are higher in the North than in the South. One factor in the high death rate is the high infant mortality rate which is 157 for China but ranges from 131 for male infants in South China to the extremely high rate of 218 for females in North China, where the traditional status of women and infants is low.

The annual increase is 10.9 per thousand living inhabitants. If this rate of increase obtains throughout China,

the population must be increasing between four and five million people a year. Since the amount of cultivated land per capita is 3.3 mou, the problem of food shortage is very acute. Frequent famine and other catastrophes seem to be the only way of relieving population pressure at present in China.

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PAMPHLETS FOR DISTRIBUTION

AS a part of its service in the field of health education, the Milbank Memorial Fund from time to time secures reprints of papers by its staff members and associates, published in its own or outside periodicals, for distribution to interested readers. Following is a partial list of the reprints available for distribution, copies of which may be had upon request. Unless otherwise specified, there is no charge for these pamphlets.

ACCURACY OF OFFICIAL TUBERCULOSIS DEATH RATES, THE. Jean Downes. *Journal of the American Statistical Association*, December, 1931.

ACCURACY OF THE RECORDED BIRTH STATISTICS IN URBAN AND RURAL AREAS, THE. Jean Downes. *Journal of the American Statistical Association*, March, 1929.

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